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The purpose of this study was to assess the importance of teacher attitudes, maternal attitudes, and traditional versus Montessori nursery school training on the learning and achievement of the preschool child. Eighty-two middle class children and thirty-eight disadvantaged children who attended either Montessori or traditional preschools comprised the sample. The children were tested in the fall on the Stanford-Binet and Peabody Picture Vocabulary Test and retested in the spring with the Caldwell Preschool Inventory and the Stanford-Binet. Teachers of nursery school classes completed the Minnesota Teacher Attitude Inventory, and mothers of the children completed the Maryland Parent Attitude Survey. Results of the study showed that middle class Montessori children scored significantly higher on personal-social responsiveness, associative vocabulary, and total test scores than middle class children in a traditional nursery school program. Disadvantaged Montessori children also obtained significantly higher scores than did their counterparts in a traditional program. Further findings indicated that democratic teacher attitudes were not highly related to preschool children's achievement and that maternal attitudes had no significant effect on the achievement of these children. (MS)

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by

Helen R. Cox

The Catholic University of America

Washington, D. C.

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CHAPTER I

SUMMARY

The purpose of this study was to assess the importance of the following variables on the learning and achievement of the preschool child: attitudes of the teacher, attitudes of the mother, and type of nursery school training--traditional or Montessori.

A need to determine the effects of several environmental variables on the learning of preschool children was noted. The differences in philosophy and practice between the kinds of nursery schools, Montessori and traditional, were presented. The Montessori schools emphasize skills of practical life, sensory concepts, and reading, writing, and arithmetic through a series of activities designed to interest and challenge the child. The child is free to work alone or with others on an activity at his level. Little group work is conducted. Traditional nursery schools stress the importance of play as the child's aid to understanding his world. The social and emotional development of the child are most important in establishing a base for the intellectual exercises of the elementary school.

The attitudes of the teachers in the classroom and how these attitudes affect learning were also discussed. A warm, democratically-inclined teacher was hypothesized as being one who would establish in her classroom the kind of atmosphere most conducive for learning to take place.

The attitudes of mothers were discussed in terms of their relationship to achievement need (motivation) of the child to learn. Research literature has indicated that mothers who were accepting of their children, yet demanding and firm would encourage the development of achievement need in their children.

Problems to be Considered.—The study attempted to answer the following questions:

1. Will the level of achievement of those children attending one type of nursery school significantly differ from the level of achievement of children attending a different type of nursery school?

2. Do children attending different types of nursery schools learn different types of concepts and/or skills?
3. Does the level of achievement of children differ when mothers of these children hold differing attitudes toward their children and toward child rearing?
4. Does the level of achievement of children differ when their teachers hold differing attitudes toward the children in their classes?
5. Does the level of achievement vary with the interaction of several of these variables, i.e., teacher attitudes and parental attitudes, teacher attitudes and type of nursery school training, or teacher attitudes, parent attitudes and type of nursery school training?
6. Do these factors vary by socio-economic level, middle and lower?

Procedure.--The middle-class part of the study involved several phases. One hundred fifteen middle-class children attending three Montessori and three traditional nursery schools were given the Stanford-Binet Intelligence Scale and the Peabody Picture Vocabulary Test in the fall of 1967. These children, who ranged in ages from 3-0 to 3-11 on October 1, 1967, were chosen from classes which had experienced teachers who had either graduated from the Washington Montessori Institute or a four-year college with a degree in early childhood or elementary education. The teachers for each class completed the Minnesota Teacher Attitude Inventory and the mothers completed the Maryland Parent Attitude Survey. The children were retested in the spring with the Caldwell Preschool Inventory. The final middle-class sample consisted of eighty-two children who had completed the school year and whose teachers and mothers completed attitude surveys.

Essentially the same procedure was followed for the disadvantaged children. In the fall of the year all children attending the chosen classes were tested with the Stanford-Binet Intelligence Scale. There was no restriction made as to age because of the small numbers of children enrolled in the classes. Mothers of these children were given the Maryland Parent Attitude Survey, administered individually by a trained examiner. The teachers of these children completed the Minnesota Teacher Attitude Inventory. The children were retested in the spring with the Caldwell Preschool Inventory and the Stanford-Binet Intelligence Scale. The final sample of disadvantaged children consisted of thirty-eight children who completed the school year and whose teachers and mothers completed attitude surveys.

Analysis of Data.--Scores for the disciplinarian and indulgent scales of the Maryland Parent Attitude Survey were added and the median found for each socio-economic class. These scores were assigned to "high" and "low" categories as the scores on the MTAI were above or below the median.

For each socio-economic group, teacher tests were assigned to "high" and "low" categories as the scores on the MTAI were above or below the median for each type of nursery school. In the middle-class study, it was discovered that the teacher scores were not distributed in such a manner as to be able to use the high and low categories. Therefore, the teacher attitude variable was dropped from the analysis of variance. Problems also occurred with the teacher variable in the lower-class study. Because of the small sample and the fact that one of the teachers had been replaced in April, the teacher variable was dropped from the analysis of variance in the disadvantaged study as well. Pearson product-moment correlations were made between teacher scores and children's achievement scores.

Within each socio-economic group, children's achievement scores were assigned to the following groups:

1. Montessori school--Maternal attitude high
2. Montessori school--Maternal attitude low
3. Traditional school--Maternal attitude high
4. Traditional school--Maternal attitude low

Data was analyzed using an unweighted means method of solution of the analysis of variance for unequal n's. For the disadvantaged sample, standard scores were used rather than raw scores in the analysis of variance to control for the age differences.

Results.--The only F ratios which were significant in the analysis of variance of preschool children's achievement scores were those for type of nursery school training.

On Personal-social Responsiveness, Associative Vocabulary, and the total score, middle-class Montessori nursery-school children obtained significantly higher scores than did middle-class traditional nursery-school children. Disadvantaged children attending Montessori schools obtained significantly better scores than did disadvantaged children attending traditional nursery schools on all parts of the test except one.

There was a near-zero correlation between teacher attitudes and children's achievement. When divided by socio-economic level and sex, however, high teacher attitude scores correlated positively and significantly with middle-class girls' achievement on two subscores and the total achievement test.

Maryland Parent Attitude Surveys were analyzed for differences between socio-economic class. T tests on the significance of differences between the means of each of the scales showed significant differences for two: disciplinarian and indulgent. Middle-class mothers had lower scores on the disciplinarian and higher on the indulgent scale than did mothers of disadvantaged children.

Discussion.--In this study democratic teacher attitudes were not highly related to the achievement of preschool children. While a democratic attitude is probably an important factor in teacher attitudes, there are other important considerations. The low correlations between teacher attitude scores and achievement of nursery school children was seen as evidence of the fact that different teachers affect pupils differently and that other factors such as stimulation and expectation may contribute greatly to the effectiveness of the teacher and the achievement of her students.

Maternal attitudes, as measured in this study, had no effect on the achievement of nursery school children. In spite of these results, the hypothesis that parents who are demanding and accepting encourage achievement behaviors in their children still seems tenable. Possible reasons for the lack of effects in this study were explained in terms of the use of the scales, the possibility of different types of achievement needs of children, and other aspects of parent-child interaction which might affect the achievement of children and which were not detected by the MPAS. Among these are the expectations, goals, and values of the parents and the involvement of parents with their children--all of which may have greater effect on the achievement of nursery school children.

The effects of nursery school training were significant in the analysis of variance of preschool children's achievement scores. Montessori-school children obtained significantly higher scores than traditional-school children. The differences in achievement of children who attend different types of nursery schools may be thought of in terms of differences in cognitive maturity of these children. This may occur as a result of several things: one, the Montessori system of precisely graduated materials may allow the child to assimilate and adapt new concepts into his existing cognitive structures.

Two, the fact that the Montessori method encouraged individual activities and the freedom to choose among these activities for whatever length of time the child chooses may enable the child to find an activity which fits his particular phase of development. Three, older children are in the same classroom and may be used as models for speech and general behavior.

Conclusions and Suggestions for Further Research.--Exactly what part of the Montessori school environment contributed to the differences in achievement is a matter of conjecture and certainly an area for further research. Is it the wide range of age and ability of children present in each classroom, the fact that each child works individually and at his own pace, the expectation that all children will learn, or some combination of these or other factors that fosters greater achievement? The only thing that can be said with much certainty is this: Montessori schools seem to be doing what they say they are, that is, developing intellectual abilities in their children.

This study has raised many more questions than it has answered. It has pointed the way for further research in many areas. Some suggested areas are:

1. longitudinal studies of traditional and Montessori children to determine whether or not the early gains in intellectual ability will be kept or will change
2. studies of social and emotional development to determine whether or not there are differences among children attending different nursery schools in their ability to socialize and to handle their emotional problems
3. studies of the self-concept and particularly the effect of competence on the self-concept of nursery school children.
4. research on the importance of sensory experiences and their relationship to intellectual development both within the Montessori system and outside of it
5. research on the many facets of teacher and maternal attitudes.

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CHAPTER II

THE NATURE OF THE PROBLEM

Introduction

Early childhood education has been a subject of study and contention for many years. Research in the field may be classified in four major groups: one, the normative, which describe and compare behavior which occurs in the natural setting of the nursery school; two, the studies of social and emotional development, which are usually comparisons of children with nursery school experiences compared to children without nursery school experiences; three, the studies of intellectual development as measured by changes in IQ; and four, the studies of early intervention for children of deprived environments, which may include intellectual as well as social and emotional development in their scope.

In a typical normative study, Shure[1] described patterns of behavior of boys and girls in five indoor areas of the nursery school. Earlier studies found that sand play was the most contentious activity,[2] that the average duration of quarrels in the nursery school is twenty-three seconds[3] and that three-year-olds were more interested in a lamb, a pig, and a chicken than some earthworms, a tadpole, or the garden.[4] Observational methods are most commonly used, little attention is given to intellectual processes, and underlying motives are seldom considered.

Studies of social and emotional development are the next most common type of nursery school study. Researchers in this area are concerned with the differences in social and emotional development of children who had nursery school experiences compared with those who had no such education.[1] This is measured, most often, by the child's adjustment to kindergarten or first grade or by his "degree of readiness" for first grade work.[2,3,4,5] These studies generally had mixed results as to the advantage of nursery school on later schooling. The advantage which existed for the nursery school children usually disappeared by the end of the kindergarten or first-grade years. The initial studies neglected the possibility that children who have received preschool experiences need a different type of kindergarten and first-grade program, but that problem has recently been recognized.[6]

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[1] Myrna Beth Shure, "Psychological Ecology of a Nursery School," Child Development, XXXIV (December, 1963), 979-992.

[2] Elsie H. Green, "Group Play and Quarreling Among Preschool Children," Child Development, IV (1933), 302-307.

[3] Helen C. Dawe, "An Analysis of Two Hundred Quarrels of Preschool Children," Journal of Genetic Psychology, V, No. 2 (June, 1934), 155.

[4] Gertrude E. Chettenden, "Among the Youngest Scientists," Childhood Education (April, 1939), 351-356.

While social and emotional development is still an important aspect of preschool education, there has been a growing interest in cognitive features. Many researchers, both early and recent, have attempted to determine the importance of nursery school education through changes in the IQ of the child attending school.[1,2,3,4,5] Interest in cognitive aspects of preschool education was given impetus recently by reports such as those of O. K. Moore[6] and Siegfried Engelmann and Carl Bereiter[7] of unusual achievements of preschool children of both middle and lower classes.

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[1] Arthur T. Jersild, Child Psychology (6th ed., Englewood Cliffs, N.J.: Prentice-Hall, 1968), pp. 262-265.

[2] Hazel M. Cushing, "A Tentative Report on the Influence of Nursery School Training Upon Kindergarten Adjustment as Reported by Kindergarten Teachers," Child Development, V, No. 4 (December, 1934), 304-314.

[3] Ann Wilson Brown and Raymond G. Hunt, "Relations Between Nursery School Attendance and Teachers' Ratings of Some Aspects of Children's Adjustment in Kindergarten," Child Development, XXXII (1961), 585-596.

[4] G. Allen and J. Masling, "An Evaluation of the Effects of Nursery School Training on Children in Kindergarten, First and Second Grade," Journal of Educational Research, LI (1957), 285-296.

[5] M. E. Bonney and E. L. Nicholson, "Comparative School Adjustments of Elementary School Pupils With and Without Preschool Training," Child Development, XXIX (1958), 125-133.

[6] "Is Kindergarten Play Day Over?" Grade Teacher, LXXXV, No. 5 (January, 1968), 113-116.

Studies of early intervention also have been in evidence for some time. Changes in the IQ of orphans because of changes in environment were reported by researchers in the 1930's.[8,9] However, the establishment of Project Head Start, whose aim is to give a developmental boost to thousands of disadvantaged children through nursery school education, has focused much attention and research

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[1] Elizabeth K. Starkweather, "Preschool Research and Evaluation Project" (unpublished manuscript, Oklahoma State University, 1966).

[2] Beth D. Wellman, "The Effects of Preschool Attendance," in _Child Behavior and Development_, ed. by R. G. Barker, J. S. Kounin and K. H. F. Wright (New York: McGraw-Hill, 1943), pp. 229-243.

[3] Florence L. Goodenough, "A Preliminary Report on the Effects of Nursery School Training Upon the Intelligence Test Scores of Young Children," _Twenty-Seventh Yearbook of the National Society for the Study of Education_, Part I (Bloomington, Ill.: Public School Publicity Co., 1928), pp. 361-369.

[4] E. Kawin and C. Haefer, _Comparative Study of a Nursery School Versus a Non-Nursery School Group_ (Chicago, Ill.: University of Chicago Press, 1931).

[5] David M. Levy and Phyllis Bartelme, "Measurement of Achievement in a Montessori School and the Intelligence Quotient," _Pedagogical Seminary_, XXXIV (March, 1927), 77-89.

[6] Omar Khayyam Moore, "The Preschool Child Learns to Read and Write in the Antotelic Responsive Environment," _Behavior in Infancy and Early Childhood_, ed. by Yvonne Brackbill and George G. Thompson (New York: The Free Press, 1967), pp. 340-352.

[7] Carl Bereiter and Siegfried Engelmann, _Teaching Disadvantaged Children in the Preschool_ (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1966).

[8] Beth L. Wellman, "IQ Changes of Preschool and Nonpreschool Groups During the Preschool Years: A Summary of the Literature," _Journal of Psychology_, XX (1945), 347-368.

[9] Helen E. Barrett and Helen L. Koch, "The Effect of Nursery-School Training Upon the Mental-Test Performance of a Group of Orphanage Children," _Journal of Genetic Psychology_, XXXVIII (1930), 102-122.

on preschool problems and practices.[1,2,3,4,5,6,7]

Preschool education, in the sense of education for young children outside the home, was begun in 1840 with the establishment of the first kindergarten in Germany. Freidrich Froebel founded such a school in order to develop the mental, moral, and expressive powers of children before they entered regular elementary schools.[8] Following the teachings of Pestalozzi and Rousseau, Froebel emphasized the natural and spontaneous growth of the child. He found much symbolism in play and considered play necessary for the orderly development of the child.

Most present-day nursery school teachers consider themselves followers of Froebel. While the preparation for later schooling is still an important aim, it is thought of in terms of preparing the child to achieve the maximum social adaptation to establish a basis for the intellectual exercises which follow. Proponents of this type of nursery school traditionally have been very much opposed to any type of "academic" training in nursery school.

The most common of the cognitive-type schools, Montessori schools, are enjoying a resurgence in this country after an early

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[1] James Slaven, "Montessori Head Start," Audiovisual Instruction, II (September, 1966), 546-549.

[2] Clara M. D. Riley and Frances M. J. Epps, Head Start in Action West Nyack, N.Y.: Parker Publishing Co., Inc., 1967.

[3] Thelma G. Wolman, "A Preschool Program for Disadvantaged Children--The New Rochelle Story," Young Children, XXI (November, 1965), 98-111.

[4] Florence P. Foster, "The Impact of Early Intervention," Young Children, XXI, No. 6 (September, 1966), 354-360.

[5] Miriam L. Goldberg, "Problems in the Evaluation of a Compensatory Program for Disadvantaged Children," Journal of School Psychology, IV, No. 3 (Spring, 1966), 26-36.

[6] Robert Gaebler, "Project Head Start in Chicago: 1965," Journal of School Psychology, IV, No. 3 (Spring, 1966), 21-25.

[7] Susan W. Gray and Rupert A. Klaus, "The Early Training Project: An Intervention Study and How It Grew," Journal of School Psychology, IV, No. 3 (Spring, 1966), 15-20.

[8] Freeman R. Butts, A Cultural History of Western Education (New York: McGraw-Hill Book Co., Inc., 1955), p. 402.

decline in popularity.[1] The founder of this type of school, Maria Montessori, developed in Italy a method of teaching young children skills of practical life, reading, writing, and arithmetic through activities which interested and challenged the child.[2] While considering emotional development important, Montessori schools spend little time on the kinds of "socialization activities" of traditional nursery schools.

The interest of the general public in the question of early childhood education is seen in the interest and approval Project Head Start has received in most locales, as well as in the immediate popularity of two 1967 publications of divergent view: Eda LeShan's The Conspiracy Against Childhood[3] which espouses the traditional values, social and emotional development, of early childhood education; and Maya Pines' Revolution in Learning[4] which calls for more cognitive content in nursery schools.

A continuing controversy between these two approaches to nursery school education and the lack of data on the subject led the author to the present research. While a great deal has been said about the merits of the various methods, the controversy seems to lie in the way one views the nature of the young child.

"Developmental and psychodynamic theory defines the nature of the young child as rather fragile, autistic, and irrational, at the mercy of his emotional life."[5] Emotional damage to the child is believed to be an inherent consequence of early training in cognition. While Fowler notes that these attitudes originated primarily as a reaction to "historically inadequate and stringent methods," the fears have generalized to encompass early cognitive learning, per se, as intrinsically hazardous to development.[1]

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[1] Mary Faison Richardson, "The Relationship of the Montessori Method of Pre-School Education to Current Nursery School Theory and Practice in America" (unpublished Master's dissertation, Vassar College, 1940).

[2] E. M. Standing, Maria Montessori: Her Life and Work (Fresno, California: Academy Guild Press, 1962).

[3] Eda LeShan, The Conspiracy Against Childhood (New York: Atheneum, 1967).

[4] Maya Pines, Revolution in Learning (New York: Harper and Row, 1967).

[5] William Fowler, "Cognitive Learning in Infancy and Early Childhood," Psychological Bulletin, LIX, No. 2 (March, 1962), 139.

These beliefs are intrinsic to learning readiness which is the second area of difference in the way one regards the nature of the child. The process of development is viewed biologically: intelligence and various abilities are postulated as inherited. "They emerge through a process of unfolding along a growth continuum in several ordered stages of maturation." Readiness is equated with maturation and is conceived in absolute and immutable terms.

These beliefs led to further presumptions: that the young child is immature and restless;[2] that to encourage the child to read, for example, before the chronological age of six years, six months is dangerous as well as wasteful;[3] that the child looks for and needs a dependent relationship with his teacher;[4] that extensive participation in social relations is essential for the most balanced personal development.[5]

A growing body of research has contributed to the reassessment of these positions. The excellent adjustment and accomplishments which gifted children have realized (reported in Fowler[6]) and the early readers of Durkin suggest the value of intensive early stimulation (which apparently all gifted children and all early readers receive.)[7] The sustained interest in projects (or "interest binges" as Durkin called them) which early readers exhibited are in marked contrast to the short concentration span children are purported to have. The great variety of studies on all types of readiness suggest that age norms derived from tests built to assess a given skill level provide no certain evidence as to what age the skill might first be taught and learned provided the learning conditions were effectively arranged;[1] and, that except for such traits as walking and grasping, the mean ages of readiness can never be specified apart from the relevant environmental conditions.[2]

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[1] Ibid.

[2] Educational Policies Commission, Education and the Disadvantaged American (Washington, D.C.: National Education Association, 1962).

[3] Helen Heffernan, "Significance of Kindergarten Education," Childhood Education, XXXVI (March, 1960), p. 316.

[4] Clark E. Moustakas and Minnie Perrin Berson, The Young Child in School (New York: Whiteside Inc. and William Moorow and Co., 1956), p. 116.

[5] Fowler, Psychological Bulletin, LIX, No. 2, 9.

[6] Ibid., p. 139.

[7] Delores Durkin, Children Who Read Early (New York: Teacher's College Press, 1966).

Researchers have come to realize that by concentrating so much on the proper ages for children to do certain things, we may have neglected methods and programs aimed at developing each child to the maximum of his capacities. As Fowler has suggested, "In harking constantly to the dangers of premature cognitive training, the image of the 'happy' socially adjusted child has tended to expunge the image of the thoughtful and intellectually educated child."[3]

This, then, is the nature of the controversy between supporters of cognitive-type schools, such as Montessori, and supporters of traditional nursery school education.

It has been realized that many kinds of additional research in early childhood education are necessary in order to determine the value of various practices, types of equipment, methods of teaching, etc. Among those matters suggested for inquiry were comparative studies of Montessori and traditional methods,[4] and a few pilot studies have been made. Argy[5] studied brain-damaged children at the District of Columbia's Crippled Children's Center, but his study was complicated by the fact that brain-damaged children are difficult to match. Fleege[6] working with twenty-one pairs of normal children, found gains for Montessori children on many different items. Both of these studies tried to match children for age, sex, IQ, and socio-economic group, but neither of them considered the differences among teachers of the children or differences among parents which could account for the variations in the abilities of the children involved. Leaders in the field of early childhood education have pointed out the importance of considering the child's parents in assessing his abilities.[1] The child's teacher is also important. According to Moustakas, "The emotional climate the teacher creates is basic to all other conditions in the nursery school."[2]

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[1] Lois N. Hendrickson and Siegmar Muehl, "The Effect of Attention and Motor Response Pre-training on Learning to Discriminate B and D in Kindergarten Children," Journal of Educational Psychology, LIII, No. 5 (October, 1962), 236-241.

[2] David P. Ausubel, "Viewpoints from Related Disciplines: Human Growth and Development," Teacher's College Record, L (February, 1959), 245-254.

[3] Fowler, Psychological Bulletin, LIX, No. 2, 9.

[4] Barbara Edmonson, "Let's Do More Than Look: Let's Research Montessori," Journal of Nursery Education, XIX (November, 1963), 36-41.

[5] William P. Argy, "Montessori Versus Orthodox: A Study to Determine the Relative Improvement of the Preschool Child with Brain Damage Trained by One of Two Methods," Rehabilitation Literature, XXVI (1965), 245-254.

[6] Urban H. Fleege, "A Study of the Comparative Effectiveness of Montessori Preschool Education," (unpublished report, Cooperative Research Branch, Office of Education, June, 1967).

The purpose of this study is to assess the importance of the following factors on the learning and achievement of the young child: attitudes of the mother, attitudes of the teacher, and the type of nursery-school program, Montessori or traditional.

Statement of the Problem

By means of this study, answers to the following questions will be sought: (1) Will the level of achievement of those children attending one type of nursery school differ from the level of achievement of children attending a different type of nursery school? (2) Do children attending different types of nursery schools learn different types of concepts and/or skills? (3) Does the level of achievement of children differ when mothers of these children hold differing attitudes toward their children and child rearing? (4) Does the level of achievement of children differ when their teachers hold differing attitudes toward children in their classes? (5) Does the level of achievement vary with the interaction of several of these variables, i.e., teacher attitudes and parental attitudes, teacher attitudes and type of nursery school training, or teacher attitudes, parent attitudes and type of nursery school training? (6) Do these factors vary by social class, middle and lower?

Thus, the aim of this study is to determine:

1. Whether or not the level of achievement of those children attending one type of nursery school, (Montessori), will be significantly higher than the level of achievement of children attending the other type of nursery school, (traditional).

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[1] Evelyn G. Pitcher, "Learning Academic Subjects in the Kindergarten," Journal of Nursery Education, XVIII (September, 1963), 490.

[2] Moustakas and Berson, The Young Child in School, p. 117.

2. Whether or not differences in type of learning occur in children attending different types of nursery schools.
3. Whether or not the level of achievement of children will be significantly higher when the parents of these children hold different attitudes toward children and child rearing.
4. Whether or not the level of achievement of children will be significantly different when their teachers hold differing attitudes toward children.
5. Whether or not the possible interaction between the three variables--teacher attitudes, maternal attitudes, and type of nursery school training--produces differences in level of achievement.
6. Whether or not differences in the amount and type of learning occur because of difference in social class, middle or lower.

Review of Research and Support of Hypotheses

There are many findings of concern to these problems of teacher attitudes, maternal attitudes, and nursery school education. A brief summary of the more pertinent studies follows.

Underlying attitudes may influence a great variety of behaviors. Attitudes of parents affect the way parents treat their children and thereby affect parent-child relationships. Studies have related various parental attitudes to many things: curiosity,[1] creativity,[2] social maturity,[3] and achievement in high schools.[4] Collard[5] discovered a relationship between achievement motive and expectancies of their mothers in four-year-olds. Shaw and McCuen[1] confirmed the belief that children form achievement patterns before entering school. High scores by parents on authoritarian scales were correlated with achievement in their children in studies by Drews and Teahan[2] and Holland.[3] Parents of high need achievers[4] as well as parents of achievers (vs. underachievers)[5] were found to demand more and to expect their children to master skills early in life.

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[1] Wallace H. Maw and Ethel W. Maw, "Children's Curiosity and Parental Attitudes," Journal of Marriage and the Family, XXVIII, No. 3 (1966), 343-345.

[2] A. S. Dreyer and Mary B. Wells, "Parental Values, Parental Control and Creativity in Young Children," Journal of Marriage and the Family, XXVIII, No. 1 (February, 1966), 83-88.

[3] Boris M. Levinson, "Parental Achievement Drives for Preschool Children, The Vineland Social Maturity Scale and the Social Deviation Quotient," Journal of Genetic Psychology, XCIX (Spring, 1961), 113-128.

[4] Elizabeth M. Drews and J. E. Teahan, "Parental Attitudes and Academic Achievement," Journal of Clinical Psychology, XIII, No. 4 (October, 1957), 328-332.

[5] Ester D. Collard, "Achievement Motive in the Four-Year-Old Child and Its Relationship to Achievement Expectancies of the Mother," (unpublished Ph.D. dissertation, University of Michigan, 1964).

A person's self-concept is largely derived from the opinions important people in his life express toward him. During ages one to five, the child identifies closely with his parents and his self-concept is derived largely from their attitudes toward him. Of the parents, the mother may be the more pervasive influence because the children usually have more contact with her. The mother-child relationship, then, is presumed to influence the personality development and the self-concept of the child.

The satisfaction of the child's psychological needs is necessary to the maintenance of an adequate self-concept. One important need which affects a child's learning (because of its motivational nature), is his need for achievement. According to theory, when other factors are held constant, a child who has a higher need for achievement will learn more than one whose need for achievement is lower.[6] Furst's findings suggest that motivation for achievement is largely independent of the ability of the child.[7]

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[1] M. C. Shaw and J. T. McCuen, "The Onset of Academic Underachievement in Bright Children," Journal of Educational Psychology, LI (1960), 103-108.

[2] Drews and Teahan, Journal of Clinical Psychology, XIII, No. 4, 330.

[3] J. L. Holland, "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, LII (1961), 136-147.

[4] Marian Winterbottom, "The Relationship of Need for Achievement in Learning Experience to Independence and Maturity," in Motives in Fantasy Action and Society, ed. by J. Atkinson (Princeton, N.J.: Van Nostrand, 1958).

[5] Merville C. Shaw, "Note on Parent Attitudes Toward Independence Training and Academic Achievement of Their Children," Journal of Educational Psychology, LV, No. 6 (1964), 371-374.

[6] David C. McClelland, et al., The Achievement Motive (New York: Appleton-Century Crofts, Inc., 1953), p. 238.

[7] Edward J. Furst, "Validity of Some Objective Scales of Motivation for Predicting Achievement," Educational and Psychological Measurement, XXVI, No. 4 (Winter, 1966), 927-933.

Collard has shown this achievement motive to be measurable in the preschool child.[1] Rosen and D'Andrade have demonstrated that parents who set high goals and supported the child in the achievement of these goals enhanced achievement motivation in their children.[2] Demands of the parents, thus presented, encouraged the child to set high but attainable goals for himself. The child persisted in his efforts to perform a difficult task even if he failed initially, motivated by his desire to secure continued approval of his loving but demanding parents. Baumrind[3] found that parents of the most competent and mature nursery school boys and girls were notably firm and demanding but also loving and understanding. Baumrind and Black[4] confirmed these results and reported that firm demanding behavior on the part of the parent was associated in the child with various aspects of competence.

We would then expect children of parents who were nurturant and supportive as well as demanding to have a higher need for achievement and to profit more from their experiences in nursery school than children of parents who were less demanding and more permissive and punitive.

The second variable under consideration is teacher attitudes. Pitcher[5] has suggested that the teacher is the single most important factor in early group experiences for young children. The personality of the teacher affects her attitudes toward her students and toward her work. Her attitudes will affect the organization and quality of education which goes on in her classroom as well as the curiosity and enthusiasm her students exhibit. Teacher attitudes will determine the learning atmosphere in any classroom apart from the method the teacher uses. A teacher whose approach to learning is child-centered may produce very different behaviors in her students than a teacher whose attitude is more subject-centered. A dominating teacher may stifle creativity and spontaneity. Cronbach[1] has suggested that an impersonal teacher finds it impossible to give continued support and encouragement to students who are not progressing, and these students may build up tensions which operate against the learning process. Teacher attitude has been said to be more important than method or technique.[2,3]

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[1] Ester D. Collard, "Achievement Motive in the Four-Year-Old Child and Its Relationship to Achievement Expectancies of the Mother." [illegible]

[2] B. C. Rosen and R. D'Andrade, "The Psychological Origins of Achievement and Motivation," *Sociometry*, XXII (1959), 185-218.

[3] Diana Baumrind, "Child Care Practices Anteceding Three Patterns of Preschool Behavior," *Genetic Psychology Monographs*, LXXXV (1967), 42-88.

[4] Diana Baumrind and Allen E. Black, "Socialization Practices Associated with Dimensions of Competence in Preschool Boys and Girls," *Child Development*, XXXVIII, No. 2 (1967), 325.

[5] Pitcher, *Journal of Nursery Education*, XVIII, 490.

In an extensive series of studies with older children, Anderson and his colleagues[4,5,6] found that a higher frequency of integrative behaviors (as opposed to dominative behaviors) of a child's teacher was associated with high frequency of socially integrative behaviors in the child. In addition, these children exhibited a high frequency of expressions of spontaneity and initiative as well as higher scores on problem-solving behavior than students under the dominating teacher. This confirmed the study of Lewin, Lippitt, and White[7] which found that ten-year-old boys under authoritarian leadership were less responsible, lacked initiative, and had more negative attitudes toward the task than boys under democratic leadership.

Research relating teacher style to pupil achievement is of recent origin and has had mixed results.[1] There is a paucity of studies on nursery school teachers,[2] and most of the recent reports have been conducted with Head Start teachers and students. Harvey, et al.,[3] classed Head Start teachers as "abstract" or "concrete" on the basis of tests of conceptual or belief systems and found differences in their teaching approaches. The more abstract teachers were clearly superior to the extent that they produced educationally desirable atmospheres in their classrooms. Mackie, et al.,[4] found differences in teaching styles among Head Start teachers which were associated with various kinds of behavior and achievement in their children.

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[1] Lee J. Cronbach, Educational Psychology (Chicago: Harcourt, Brace and Co., Inc., 1963), 2nd ed., p. 522.

[2] Donald McNassor, "Reflections on Childhood Identity and the School," Prevention of Failure (Washington, D.C.: Department of Elementary-Kindergarten-Nursery Education, NEA, 1965), pp. 16-32.

[3] Clark Moustakas, The Authentic Teacher: Sensitivity and Awareness in the Classroom (Cambridge, Mass.: Howard A. Doyle, 1966), pp. 37-38.

[4] H. H. Anderson and Helen M. Brewer, "Studies of Teachers' Classroom Personalities," Applied Psychology Monographs, I, No. 6 (1945), 157.

[5] Ibid., II, No. 8 (1946), 128.

[6] H. H. Anderson, J. E. Brewer and Mary F. Reed, "Studies of Teachers' Classroom Personalities," Applied Psychology Monographs, III, No. 11 (1946).

[7] Kurt Lewin, R. Lippitt and R. K. White, "Patterns of Aggressive Behavior in Experimentally Created 'Social Climates,'" Journal of Social Psychology, X (1939), 271-299.

Research supports the view that teachers who are warm and understanding establish better rapport with their students,[5,6] and teachers who employ democratic practices in their classrooms have children whose problem-solving skills are more advanced.[7] Therefore, we would expect pupils to have better attitudes toward learning and higher achievement with warm, democratically-inclined teachers than with those who are more impersonal and dominative.

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[1] Miriam L. Goldberg, "Adapting Teacher Style to Pupil Differences: Teachers for Disadvantaged Children," in The Disadvantaged Child Issues and Innovations, ed. by Joe L. Frost and Glenn R. Hawkes (Boston: Houghton Mifflin Co., 1966), pp. 348-349.

[2] Pauline S. Sears and Edith M. Dowley, "Research on Teaching in the Nursery School," Handbook of Research on Teaching, ed. by N. L. Gage (Chicago: Rand-McNally & Co., 1963), p. 853.

[3] O. J. Harvey, et al., "Teachers' Belief Systems and Preschool Atmospheres," Journal of Educational Psychology, LVII, No. 6 (December, 1966), 373-381.

[4] James B. Mackie, et al., "Effects of Teacher Style on the Academic Achievement and Psychological Development of Culturally Deprived Children," (unpublished manuscript, Baltimore, Md., 1968). (Mimeographed.)

[5] N. L. Gage and George Suci, "Social Percepts and Teacher-Pupil Relationships," Journal of Educational Psychology, XLII (March, 1951), 144-152.

[6] Dorothy Nelson Candland, "The Relationship Between the Dominative Supportive Dimension of Personality and Student-Teachers' Classroom Behavior," (unpublished Ed.D. dissertation, Stanford University, 1956).

[7] Anderson, Brewer and Reed, Applied Psychology Monographs, III, No. 11 (1946), 87.

The type of nursery school the child attends can be expected to affect the quantity and quality of his learning. Montessori schools begin at age two or three in teaching the child exercises of practical life--giving the children the necessary abilities to help themselves in a type of "independence training." From this the children progress to the sensorial equipment which gives way to exercises designed to teach reading and arithmetic. The equipment of the classroom is a part of the "prepared environment" and the teacher functions to help the child to learn to use the equipment to teach himself; she is not particularly a disseminator of information. The children are not divided into year-age groups as in most nursery schools, but ages three to six are kept together, the younger learning from the older. There is very little emphasis on group activities or social interaction. Generally, the child may choose an individual or a group activity.

The program of the typical traditional nursery school, as reported by Swift "attempts to stimulate creative expression, provide for the acquisition of information and offer learning opportunities in such areas as language, communication, and motor and social skills."[1] The daily program may be highly structured or relatively free. Instruction is given when needed in games and in use of various creative media. Occasionally there is instruction in what is generally referred to as "readiness skills"--listening, attending, discriminating shapes and sounds, etc. In traditional nursery schools, the child is generally given freedom in choosing play activities as these are generally considered secondary to his social and emotional development. Sears and Dowley have pointed out that differences between one nursery school and another are usually not in the activities carried out but in the way they are handled and in the general atmosphere maintained.[2]

Many recent studies have attempted to determine the value of preschool education as such: generally a traditional type of preschool education compared with no preschool education, or an evaluation of a

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[1] Jean W. Swift, "Effects of Early Group Experience: The Nursery School and Day Nursery," Review of Child Development Research, ed. by Martin L. Hoffman and Lois Wladis Hoffman (New York: Russell Sage Foundation, 1964), pp. 249-288.

[2] Sears and Dowley, Handbook of Research On Teaching, pp. 814-864.

Head Start program.[1,2,3,4,5] Most of the studies contrasting Montessori school programs with traditional nursery school programs are recent. Argy,[6] studying brain-damaged children, found that students in Montessori classes exhibited more improvement in the whole profile--ambulation, hand skills, speech, and "school" achievement--than did those in traditional classes. Fleege[7] agreed that normal children attending Montessori schools made significantly greater gains in verbal ability as well as in a factor called "positive attitude toward learning" than did their matched counterparts at traditional schools.

We have, then, two different approaches to nursery school education: one which encourages social interaction and creative arts and the other which follows a rigid sequence of prescribed exercises designed to teach reading, writing, and arithmetic. Students receiving instruction under such different programs would be expected to differ in the kind and amount of abilities they acquire. Students in Montessori schools will be taught directly certain skills. We would expect, then, greater gains in discriminative ability, number skills, and verbal ability than that of children in more traditional nursery schools. We might expect, however, children in traditional nursery schools would be more socially adept and responsive to other people than children attending Montessori schools.

Statement of the Hypotheses

In undertaking this study, the investigator has been guided by the hypotheses that:

H_1 The overall level of achievement of children attending Montessori schools will be significantly higher than the overall level of achievement of children attending traditional nursery schools.

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[1] Gray and Klaus, Journal of School Psychology, IV, No. 3, 15-20.

[2] Starkweather, "Preschool Research and Evaluation Project."

[3] Brown and Hunt, Child Development, XXXII (1961), 585-596.

[4] Allen and Masling, Journal of Educational Research, LI (1957), 285-296.

[5] H. E. Seidel, Jr., Mary Jo Barkley and Doris Stith, "Evaluation of a Program for Project Head Start," Journal of Genetic Psychology, CX (June, 1967), 195-197.

[6] Argy, Rehabilitation Literature, XXVI (1965), 294-304.

[7] Fleege, "A Study of the Comparative Effectiveness of Montessori Preschool Education."

H_2 The level of ability in personal and social responsiveness of children attending traditional nursery schools will be significantly higher than that of children attending Montessori nursery schools.

H_3 The level of achievement of children whose mothers are nurturant and demanding will be significantly higher than the level of achievement of children whose mothers are less nurturant and demanding.

H_4 The level of achievement of those children whose teachers are democratically-inclined will be significantly higher than that of children whose teachers are less warm and more authoritarian.

H_5 There will be significant interaction between type of nursery school training, attitudes of the teachers, and attitudes of the mothers.

Summary

In this chapter there was noted a need to determine the effects of several environmental variables on the learning of preschool children. The literature related to the differences between the kinds of nursery schools, Montessori and traditional, were examined. The attitudes of the mother were discussed in terms of their relationship to achievement need (motivation) of the child to learn. The attitudes of the teachers in the classroom and how these attitudes affect learning were also discussed.

The research hypotheses which have guided the investigator in the present study were stated.

A discussion of the characteristics of the children used in the sample, the schools they attend, and an outline of the procedure follows.

CHAPTER III

METHOD AND PROCEDURE

The present chapter is concerned with a discussion of sampling, the instruments used in the testing and the procedure followed in the study. The original plan for this project called for two parallel studies: one with middle-class children, the other with disadvantaged children.[1] Because of difficulties in obtaining and testing the disadvantaged sample and the resultant variation in numbers of subjects, the chapter is divided into two parts: The Middle Class and The Disadvantaged. Although the discussion of the instruments is included with the middle class it is equally important to the lower class section of the paper. Comparisons of the total group of teachers and parents are found at the end of the disadvantaged section.

The Middle Class

Sampling

Selection of Nursery Schools.--The criteria used in the selection of the nursery schools were:

1. The school must serve primarily middle-class children.
2. The school must have been in operation for at least three years.
3. The school must have an adequate physical plant.
4. The school must have a reputation for being a "good" nursery school.

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[1] In this study the terms lower socio-economic level and disadvantaged are used interchangeably.

The schools chosen were located in predominantly white, middle-class neighborhoods. Two were in Northwest Washington, D. C. and four in suburban Maryland. Tuition for the school year ranged from $425 to $550. Some schools had a few "scholarship" students, but these children were not included in the study. The fathers of the children participating in the study generally were professional men; a few were in managerial and semi-professional occupations.

All schools had been in operation for at least three years; one traditional school had been caring for children for over twenty years.

The physical plants of the schools varied greatly. One traditional school used space in a church and one Montessori school rented space in a synagogue. These two were church-related schools, one Episcopal and the other Catholic. The other four schools had buildings of their own. The buildings and grounds of the two suburban Montessori schools appeared to be much more attractive than the traditional schools, due in part to the fact that they were recently built. The schools which had buildings of their own also had greater possibilities for outdoor play space than those with rented quarters.

There is no way to determine how good a nursery school is except through observation and reputation. No quick rating scale exists and the state accrediting associations are concerned mainly with space and safety features, not the quality of the program. Therefore, the author requested a list of schools with particularly good programs from people in the field of early childhood education.

The final selection of schools was made after the author's observations of the school and, of course, consent of the teachers and administrators. Three traditional and three Montessori schools were selected in this manner. However, mid-way in the project, the headmistress of one of the traditional schools was apprehensive about the attitude surveys and withdrew her permission for the project. Directors of the other five schools were extremely cooperative and it was with children in these five schools that the study was completed.

Characteristics of the Children.--The children in the sample were those who attended school five mornings a week. Children who were on a three-day schedule or who regularly stayed afternoons were not included. The children were between the ages of 3-0 and 3-11 on October 1, 1967, and had not attended nursery school before the fall of 1967. (This eliminated many Montessori children who often start school at 2-6.)

Teacher Characteristics.--All Montessori teachers who participated in the project were trained at the Washington Montessori Institute and all had been teaching at least one year prior to the study. Traditional school teachers were trained in either early childhood education or elementary education and had also taught for at least one year previous to the study.

Instruments

Child.--The Stanford-Binet Intelligence Scale was chosen to measure intelligence and the Peabody Picture Vocabulary Test to measure vocabulary at the beginning of the school year.

For the final testing, the Caldwell Preschool Inventory was chosen for three reasons: one, it was developed specifically as an achievement measure for 3-6 year olds; two, it took a relatively short time to administer; and three, it contains items which measure three different kinds of learning. The first of these, Personal-social Responsiveness, measures the child's knowledge about his "own personal world . . . and his ability to establish rapport with and respond to the communications of another person (carrying out simple and complicated verbal instructions given by an adult.)[1] The second part of the test, Associative Vocabulary

> requires the ability to demonstrate awareness of the connotation of a word by carrying out some action or by associating to certain intrinsic qualities of the underlying verbal concept . . . , supplying verbal or gestural labels for certain functions, actions, events, and time sequences, and being able to describe verbally the essential characteristics of certain social roles.[2]

Concept Activation has two major categories: ordinal or numerical relations and sensory attributes: "High scores on this factor involve being able to label quantities, to make judgements of more or less, to recognize seriated positions . . . to be aware of certain sensory attributes . . . and to be able to execute certain visual-motor configurations. . . ."[3]

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[1] Bettye M. Caldwell, The Preschool Inventory, Directions for Administering and Scoring (Princeton, N.J.: Educational Testing Service, 1967), p. 3

[2] Ibid., p. 2.

[3] Ibid.

Parent.--The Maryland Parent Attitude Survey constructed by Donald Pumroy in 1960 was chosen as the instrument for testing maternal attitudes. The MPAS is a forced-choice test, developed in response to the need for a parental attitude instrument with social desirability controlled.[1] Previous instruments (the Parental Attitude Scale of Shoben[2] and the Parental Attitude Research Instrument of Schaefer and Bell[3]) did not control for the response set of the subjects, and therefore did not reveal the true attitudes of the parents toward child-rearing. Many items in the previous tests were obviously relating to deviant or socially desirable behaviors.[4] Stogdill[5] reported that parents often agree with contradictory attitudes if one statement expresses what appears to be a healthy attitude while the other states its converse. In the MPAS, statements classified as to a particular level of social desirability were paired with statements representing other attitudes of the same social desirability. A validity study by Tolor[6] found near-zero correlations between each of the four MPAS scales and social desirability.

The Maryland Parent Attitude Survey has four scales--disciplinarian, indulgent, protective, and rejecting. Although the descriptions of the scales given by Pumroy[7] seem to be the extremes of each dimension, the disciplinarian is comparable to the demanding parent of this study and the indulgent parent is comparable to the nurturant one. The disciplinarian parent expects fairly strict obedience from the child, sets rules explicitly, carries out punishment in a fair and consistent manner, pushes the child to achieve beyond his ability. The indulgent parents are child centered . . . the child is "showered" with warmth and affection.[8]

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[1] Donald K. Pumroy, "Maryland Parent Attitude Survey: A Research Instrument with Social Desirability Controlled," *The Journal of Psychology*, LXIV, No. 1 (1966), 73-78.

[2] J. R. Shoben, Jr., "The Assessment of Parental Attitudes in Relation to Child Adjustment," *Genetic Psychology Monographs*, XXXIX (1949), 101-148.

[3] Earl S. Schaefer and Richard O. Bell, "Development of a Parental Attitude Research Instrument," *Child Development*, XXIX (1958), 339-361.

[4] W. C. Becker and R. S. Krug, "The Parental Attitude Research Instrument - A Research Review," *Child Development*, XXXVI, No. 2 (June, 1965), 329-365.

[5] R. M. Stogdill, "The Measurement of Attitudes Toward Parental Control and the Social Adjustment of Children," *Journal of Applied Psychology*, XX (1936), 359-367.

[6] Alexander Tolor, "An Evaluation of the Maryland Parent Attitude Survey," *The Journal of Psychology*, LXVII (September, 1967), 69-74.

[7] Pumroy, *The Journal of Psychology*, LXIV, No. 1 (1966), 74-75.

[8] *Ibid.*

In the light of research by Baumrind,[1] Baumrind and Black,[2] Rosen and D'Andrade[3] it would be expected that high scores on both the D and I scales would indicate attitudes which would contribute more to academic achievement in the child, while high attitudes on either of the scales, separately, would not contribute so much. In a forced-choice test, items of each scale compete with items from every other scale. Therefore, mothers who rank above the median on the sum of both disciplinarian and indulgent scales and mothers who rank below the median were held in this study to constitute the high and low groups on maternal attitudes.

Teacher.--The Minnesota Teacher Attitude Inventory was the instrument picked to measure the teacher attitudes which underlie abilities necessary to the establishment and maintenance of desirable interpersonal relationships in the classroom. Developed by Cook, Leeds, and Callis at the University of Minnesota in the 1950's, the MTAI was designed to predict the social-emotional climate of the classroom. According to the authors, "attitudes of teachers toward children and school work can be measured with high reliability and . . . they are significantly correlated with the teacher-pupil relations found in the teachers' classrooms."[4]

The Minnesota Teacher Attitude Inventory attempts to discriminate between teachers who produce educationally desirable atmospheres in their classrooms and those who do not. Leeds[5] found that teachers who have high scores on the MTAI also had scores indicating personal cooperativeness, friendliness, objectivity, and emotional stability on the Guilford-Zimmerman Temperament Survey. The MTAI has also been correlated with measures of authoritarianism, with those persons ranking high on the MTAI, ranking low on the authoritarian scales.[6,7]

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[1] Baumrind, Genetic Psychology Monographs, LXXV (1967), 42-48.

[2] Baumrind and Black, Child Development, XXXVIII, No. 2 (1967), 291-329.

[3] Rosen and D'Andrade, Sociometry, XXII (1959), 185-218.

[4] Walter W. Cook, Carroll H. Leeds and R. Callis, Minnesota Teacher Attitude Inventory Manual (New York: Psychological Corp., 1951), p. 13.

[5] Carroll H. Leeds, "Teacher Attitudes and Temperament As a Measure of Teacher-Pupil Rapport," Journal of Applied Psychology, XL (1956), 333-337.

[6] Albert J. Kingston and George L. Newsome, "The Relationship of Two Measures of Authoritarianism to the MTAI," Journal of Psychology, XLIX (April, 1960), 333-338.

[7] Dorothy Nelson Candland, "The Relationship Between the Dominative, Supportive Dimension of Personality and Student-Teachers' Classroom Behavior" (unpublished Ed.D. dissertation, Stanford University, 1956).

The MTAI has also been found to be an index of general teaching competence.[1] Teachers rated superior by their administrators in general effectiveness were found to differ significantly from teachers rated "inferior" in their scores on the Minnesota Teacher Attitude Inventory. Teachers had been matched on the amount of their education, teaching level, subject taught and size of the school system. In a study using superior, unselected, and inferior teachers (as assessed by their principals), Leeds and Cook found superior teachers obtained a Mean of 131, unselected teachers a Mean of 77.6 and inferior teachers a Mean of -32 on the MTAI.[2]

The problem of fakability of the MTAI has been a recurrent one.[3,4,5] The test has been found easy to fake "bad" but more difficult to fake "good". Sorenson[6] reports that subjects are not able to fake unless given a cue from the instructions or elsewhere what the inventory is about. Stein and Hardy[7] found their subjects could not fake "good" without being provided an explicit set.

Collection of Data

Preliminary Testing.--The entire population of children who met the requirements listed above and who were enrolled in the selected nursery schools were tested during a three-week period in the fall.

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[1] James N. Popham and Robert R. Trimble, "The MTAI As a Index for General Teaching Competence," Educational and Psychological Measurement, XX (1960), 509-512.

[2] C. Leeds and W. Cook, "The Construction and Differential Value of a Scale for Determining Teacher-Pupil Attitudes," Journal of Experimental Education, XVI (December, 1947), 149-159.

[3] William Coleman, "Susceptibility of the MTAI To 'Faking' with Experienced Teachers," Educational Administration and Supervision, XL, No. 4 (1954), 234-237.

[4] Philip Rossi, Carmine Yengo and William Boyd, "A Comparison of Methodology and the Fakability of the MTAI," Journal of Educational Research, LIX, No. 10 (July-August, 1966), 475.

[5] R. Rabinowitz, "The Fakability of the MTAI," Educational and Psychological Measurement, XIV (Winter, 1954), 657-664.

[6] A. G. Sorenson, "A Note On the Fakability of the MTAI," Journal of Applied Psychology, XLII, No. 2 (1958), 74-78.

[7] H. L. Stein and J. Hardy, "A Validation Study of the MTAI in Manitoba," Journal of Educational Research, L (1957), 321-338.

The purpose of this testing was to determine to what extent differences existed among the children of different groups before nursery school education began. In each school, testing commenced after the school had been in operation for two weeks. Six examiners, including the author, trained in the use of the Stanford-Binet Intelligence Scale, administered that test individually to one hundred fifteen middle-class nursery school children. A shortened version of the Peabody Picture Vocabulary Test was also given to establish a vocabulary score. The testers were not told the type of school at which they were testing, but because they walked the children to and from their classrooms, it was possible for them to determine in which type of school testing was being conducted.

In each school there was some fear and negativism on the part of the children to be tested. Generally, however, after seeing their classmates leave with a tester to "play games" most of the children cooperated. The testing conditions in each school left much to be desired in the way of screening from the noise of the classrooms. While it was always possible to be out of sight of the children in the classroom, the children often had many distractions in the form of noise. This may have had the effect of depressing the IQ and vocabulary scores; however, this was a problem in all schools.

A standard procedure was used by all persons giving the Stanford-Binet. Testing for all ages was begun at Age Level III-6, #5 Sorting Buttons, the rationale being that most middle-class children of three years of age would find that test interesting and enjoyable and would probably be able to pass it. From this, the procedure was to continue up to the ceiling (if possible) and then to go back to the basal. It was agreed to assume a basal of III-6 (in the event of time problems) if the child had passed #5 and #6 at III-6 and had passed four out of six at age four. Fortunately, it was necessary to assume a basal in only three cases.

The results of this testing, given only for those children still participating in the study in the spring, are shown in Table 1.

Testing the Mothers.--The Maryland Parent Attitude Survey was given to the mothers of children tested before and after parent-teacher meetings, at separately scheduled meetings, and through the mail. It had been planned originally to call special meetings at each school to enable the mothers to fill out the MPAS, to answer any questions they might have about the study and to allay any of their fears and anxieties. About one-half of the parents attended such meetings. The procedure for mothers who did not attend was this:

the author called each one on the telephone, explaining the purpose of the survey and securing the cooperation of the mother in filling out the test which she would receive in the mail. If the blank had not been returned within three months, a follow-up call was made encouraging the mother to fill out the form and offering to send her another if she had misplaced the first. It was necessary to call fifteen mothers one third and last time in May.

TABLE 1

PRELIMINARY TESTING: MEAN AGE, IQ AND VOCABULARY BY TYPE OF NURSERY SCHOOL FOR EIGHTY-TWO MIDDLE-CLASS CHILDREN

Type of Nursery School	N	Age	IQ	Vocabulary
Montessori	46	40.07	119.8	31.48
Traditional	36	40.50	114.6	27.94

The following directions were given in addition to those on the blank: "Dear Mrs. . . . : Think of yourself when the form reads 'parents' and your child when it reads 'children'. Work as rapidly as possible and don't worry about seeming inconsistencies!"

Of the possible 115, ninety-two mothers completed the Maryland Parent Attitude Survey. Thirteen mothers were not contacted because their children were dropped from the project: four from the school which declined to continue with the study; four others because it was discovered that these children had attended school the previous year; five because one of the schools changed directors in mid-year and discharged a teacher whose children had been participating in the study. Two mothers had already moved away before the maternal attitude scales were given. One mother returned the test, indicating that she thought it was an invasion of privacy, another was too ill, and a third felt too threatened by the questionnaire to fill it out. Three mothers who had agreed to take the test never returned their blanks for reasons unknown.

Retesting the Children.--The Caldwell Preschool Inventory was given to all children still attending nursery school during a two-week period in May. The examiners were three young women who were not told the type of nursery school in which they were testing or the hypotheses on which the study was based. The final sample consisted of eighty-two middle-class nursery school children.

The Disadvantaged

Sampling

Three preschool classes using the Montessori method were found among the Head Start groups in the District of Columbia. Because of their own research, Head Start personnel assigned only two of these classes and one traditional Head Start class for use in this study. Two other Montessori classes which contained both middle- and lower-class children, and a large traditional preschool class sponsored by the Department of Recreation were also chosen. All these schools drew children from the inner-city poverty area. Final achievement scores of children in the Montessori classes which contained both middle- and lower-class children were compared with scores of children in the Head Start Montessori classes. It was decided to include the disadvantaged children from the classes which contained both middle and lower-class children only if no significant differences existed on final achievement scores between them and children attending the Montessori Head Start classes. (If significant differences existed, they might be attributed to the presence of the middle-class children.)

Four of the schools used church buildings or basements, one used a basement room of a school. There was an attempt to make all the rooms bright and cheerful, but the two classes which were held in basements were dreary in spite of the effort. At one school there was no outdoor play space (the children had to go to a park) but at the others there was a black-topped area on which the children could play.

Collection of Data

Preliminary Testing.--Children attending the chosen classes were tested with the Stanford-Binet Intelligence Scale in November and December, 1967. The purpose of this testing, as in the middle-class, was to determine to what extent differences existed among the children of different groups before nursery school education began. Four examiners, including the author, administered the test individually to fifty-two disadvantaged children. The Peabody Picture Vocabulary Test was not given to this group because it had been used by the Head Start Testers.

It should be noted that there were eighty-two disadvantaged children enrolled in these classes at that time. Two Head Start mothers declined to allow their children to participate in the study, four children were untestable (brain-damage, lack of speech, and fear and/or negativism). Twenty-four children were absent or had already dropped out of the program by the time of the initial testing, and some had enrolled only the month before! (In the Head Start classes, testing could only be conducted at designated times, which made it impossible to get scores for some of the children who had not dropped out but had only been absent on testing days.)

Testing was difficult with these children. It was the first time many of them had had a one-to-one relationship of any kind with an adult. Their poor pronunciation, unusual speech patterns, and shyness with the testers (in spite of long periods to establish rapport) probably lowered their scores. However, the testing conditions, though still far from ideal, were better generally than those in the middle-class schools.

The same test procedure was used with the disadvantaged children as with the middle-class children, beginning testing at #3-6 Buttons.

Testing the Teachers.--During the month of February, seven teachers, five Montessori and two traditional, completed the Minnesota Teacher Attitude Inventory.

Testing the Mothers.--The Maryland Parent Attitude Survey was administered individually in their homes to the mothers of children attending the chosen classes by three mothers who had been trained in the techniques of using the survey with others. Instructions to these mothers were read and explained by the testers. If the mother was unable or did not want to read the survey, the tester read it for her. After completion of the survey, the mother was paid $5.00 (as required by Head Start). Two mothers refused to participate (one claimed invasion of privacy and the other that she so seldom saw her son or had anything to do with him that her attitude had no effect on him). Two mothers were not at home when the tester called (after making two appointments to be there) and did not return the blank the tester left for them. A total of forty-eight mothers completed the Maryland Parent Attitude Survey.

Retesting the Children.--The Caldwell Preschool Inventory was given to all children still attending the schools chosen for study the first two weeks of June. In addition, the Stanford-Binet Intelligence Test was readministered at this time. The final sample was composed of thirty-eight disadvantaged children.

Summary

The manner in which the experiment was conducted was discussed in the preceding chapter. The nature of each sample was examined and the procedural steps were reviewed in detail. The instruments used in the study were analyzed and discussed.

The analyses of the data follows.

CHAPTER IV

ANALYSIS OF DATA

This section includes the analysis of teacher attitude scores, maternal attitude scores and children's scores on preliminary and final testing for both middle-class and disadvantaged children and adults. Comparisons of teacher and maternal attitude scores are made at the end of the section.

The Middle Class

Teacher Attitude Scores

Scores on the Minnesota Teacher Attitude Inventories were divided at the median for high and low teacher attitudes. Table 2 shows the scores obtained by the Montessori teachers and the traditional teachers. The score forty-seven, though the median itself, was considered in the low group for Montessori teachers, and 33 in the high group for traditional schools. Numbers 37 and 33 were obtained by teachers in the same class.

There were many more Montessori teachers involved in the study than traditional teachers because of the fact that each Montessori class had only a few children 3-0 to 3-11 who had not previously attended school, while whole classes of twenty or more were obtained in the traditional schools.

A Mann-Whitney U test was used to determine whether or not significant differences existed between the groups. There was no significant difference between the attitudes of teachers in the Traditional-school-high group and the Montessori school-low group. In effect, then, there were really three groups of teachers: having the highest scores, Montessori-school High; the middle group; traditional-school high and Montessori school low; and the lowest group, traditional-school low.

TABLE 2

ATTITUDE SCORES AND MEANS FOR NINE MONTESSORI AND FIVE TRADITIONAL NURSERY SCHOOL TEACHERS ON THE MINNESOTA TEACHER ATTITUDE INVENTORY

Montessori		Traditional	
68		50	
64	Mean = 61.5	37	Mean = 40
58		33	
56			
47		16	
47	Mean = 37.6		Mean = 9.5
46		3	
30			
18			
Mean = 47		Mean = 27.8	

Mann-Whitney U for p = .393. (No significant difference between Montessori low and Traditional high).

Since it was not possible to have two comparable groups of teachers at each level, it was decided not to include the teacher attitude variable in the analysis of variance.

In order to determine the degree of relationship between teacher attitudes and nursery school children's achievement scores, several Pearson Product Moment Correlations were completed. These yielded near-zero correlations between teacher attitude scores on the MTAI and children's scores.on the Caldwell. For the total group, the correlations ranged from .03 to .18.

When further divisions by sex were made some correlations were significant. Boys achievement scores were correlated with teacher's scores from .07 to -.16. Girls correlations ranged from .22 to .36.

Two subscores and the total achievement score reached significance at .05 between girl's achievement scores and teacher attitude score on the MTAI.

Maternal Attitude Scores

To obtain high and low groups for maternal attitudes, scores on the Disciplinarian and Indulgent scales were added together for each mother. The median was found to be 45.1. Those mothers above 45 were considered in the high group for maternal attitudes. Those below 45 were considered in the low group.

Children's Scores

It had been planned originally to match groups of students in each type of nursery school--on age, sex, IQ and vocabulary. With the loss of students in each school through illness, change of residence, and changes in teachers and administrators, it soon became evident that such matching was impossible. Therefore, it was decided to analyze the original information obtained on each student to determine whether or not any significant differences existed among the treatment groups before the study began.

Results of the preliminary testing are presented in Table 3. This included only those children who attended school through the third week in May, whose teachers completed the year, and whose mothers completed the Maryland Parent Attitude Survey.

TABLE 3

RESULTS OF PRELIMINARY TESTING--MEANS FOR AGE (IN MONTHS), IQ (STANFORD-BINET) AND VOCABULARY (PEABODY PICTURE VOCABULARY TEST) FOR EIGHTY-TWO MIDDLE CLASS CHILDREN

		Montessori	Traditional
High Maternal Attitude	Age	39.9	40.8
	IQ	121.4	114.9
	Voc.	31.8	26
	N	23	18
Low Maternal Attitude	Age	40.2	40.2
	IQ	118.1	114.9
	Voc.	31.2	29.4
	N	23	18

It should be noted that the Montessori school children had a slight edge in IQ on the original testing, but this was not significant.

Children's achievement scores were assigned to the following groups:

1. Montessori school, Maternal attitude high
2. Montessori school, Maternal attitude low
3. Traditional school, Maternal attitude high
4. Traditional school, Maternal attitude low

Final Analysis of Achievement Scores.--In the analysis the unweighted means method of solution for an analysis of variance for unequal n's described by Winer was used.[1] Each sub-test was analyzed separately. An alpha level of .05 was used to determine significance. Table 4 shows the significant F Ratios and source of variation for the tests. The complete analyses are found in Appendix A.

TABLE 4

F RATIOS SIGNIFICANT AT .05 FROM ANALYSES OF VARIANCE OF CALDWELL PRESCHOOL INVENTORY SCORES FOR EIGHTY-TWO MIDDLE CLASS CHILDREN

Area Tested	Source of Variation	F Ratio
Part I, Personal-Social Responsiveness	Type of Nursery School	4.12
Part II, Associative Vocabulary	Type of Nursery School	4.60
Total Score	Type of Nursery School	5.54

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[1] B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw Hill Book Co., 1962), pp. 103-104 and 231-234.

The Hartley test for homogeneity of variance was used to rule out the possibility of significant differences among the variances, following Winer's suggestion that the Bartlett test for homogeneity of variance is overly sensitive to non-normality of distribution. For this reason he does not recommend it as a preliminary test for analysis of variance. Using Hartley's test, no significant differences (at .05) among the variances were found.

The Disadvantaged

Teacher Attitude Scores

Scores on the Minnesota Teacher Attitude Inventory were divided at the median for high and low teacher attitudes. Table 5 reports the scores obtained by the Montessori and the traditional nursery school teachers.

TABLE 5

ATTITUDE SCORES AND MEANS FOR FIVE MONTESSORI AND TWO TRADITIONAL TEACHERS OF DISADVANTAGED NURSERY SCHOOL CHILDREN ON THE MINNESOTA TEACHER ATTITUDE INVENTORY

Montessori		Traditional
81 60 47	Mean = 62.67	88
32 20	Mean = 26	34
Mean = 48		Mean = 61

On April 1, one of the traditional-school teachers was reassigned to another school. This made it difficult (if not possible) to assess the importance of the teacher variable in this case. Because of this and the fact that the final sample was so small, it was decided to abandon the original design for this part of the experiment also and to use only two factors in the analysis of variance.

Teacher attitude scores, however, were correlated with children's achievement scores in order to try to determine the degree of relationship between teacher attitudes and disadvantaged nursery school children. These were generally negligible ranging from -.07 for boys to a high of .25 for girls.

Maternal Attitude Scores

As with the middle class group, scores on the disciplinarian and indulgent scales were added together for each mother and the median of each school group was found. Those mothers above 42 were considered in the high group; those below were in the low group for maternal attitudes.

Children's Scores

Children's final achievement scores were assigned to the following groups:

1. Montessori school, Maternal attitude high
2. Montessori school, Maternal attitude low
3. Traditional school, Maternal attitude high
4. Traditional school, Maternal attitude low

It was not possible to match groups of disadvantaged children in each type of nursery school on age, sex and IQ. Therefore, it was decided to analyze the original information obtained on each student to determine whether or not any significant differences existed among the treatment groups before the study began as in the middle class section. This information is presented in Table 6.

As proposed earlier, a test was made between the mean achievement scores of children attending the two types of Montessori classes: those which had middle-class children participating as well as lower-class and those which did not.

Table 6 shows great differences in age and IQ among the treatment groups. Using the norms in the Caldwell Preschool Inventory Directions for Administering and Scoring the raw scores were changed into percentiles and the percentiles into T scores for the analysis of variance. This had the effect of controlling for the age differences.

TABLE 6

PRELIMINARY TESTING--MEAN STANFORD-BINET IQ AND AGE IN MONTHS FOR FOURTEEN TRADITIONAL AND TWENTY-FOUR MONTESSORI DISADVANTAGED NURSERY SCHOOL CHILDREN

		Montessori	Traditional
		Group I	Group III
Maternal Attitude High	IQ	99	79.2
	Age	41.6	49.0
	N	12	6
		Group II	Group IV
Maternal Attitude Low	IQ	91.4	85.0
	Age	47.1	48.3
	N	12	8

Final Analysis of Achievement Scores.--The analysis of variance for the four parts of the achievement test and the total scores were made using an unweighted means analysis described by Winer.[1] Table 7 shows the significant F ratios over all parts of The Preschool Inventory. The five analyses of variance tables are presented in Appendix B as well as an analysis of variance of the change in IQ scores.

Following Winer's suggestion[2] the Hartley test for homogeneity of variance was used. There were no large departures from homogeneity of variance and the experimental hypothesis was upheld in each case.

Using a Mann-Whitney U Test, scores of Montessori and Traditional teachers from both middle and lower classes were compared. The mean for Montessori teachers was 47.9, for traditional teachers, 37.3, not a significant difference.

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[1] Winer, Statistical Principles in Experimental Design, p. 95.

[2] Ibid.

TABLE 7

F RATIOS SIGNIFICANT AT .05 FOR PARTS AND TOTAL SCORES ON CALDWELL PRESCHOOL INVENTORY BY THIRTY-EIGHT DISADVANTAGED CHILDREN

Area Tested	Source of Variation	F Ratio
Part I, Personal-Social Responsiveness	Type of Nursery School	17.3
Part II, Associative Vocabulary	Type of Nursery School	9.2
Part III, Concept Activation - Numerical	Type of Nursery School	10.4
Total Score	Type of Nursery School	13.3

All middle-class teachers' scores were compared with all disadvantaged-teachers' scores using the Mann-Whitney U Test. Teachers of the disadvantaged had a mean score of 51.7, higher, but not significantly so, than the teachers of the middle-class who obtained a mean of 40.6.

Differences were significant between middle- and lower-class mothers on two of the four scales of the Maryland Parent Attitude Survey. Lower socioeconomic class mothers were more disciplinarian and less indulgent than middle-class mothers. Differences on the protective and rejecting scales were not significant. (See Table 8).

Summary

Teacher and maternal attitude scores were analyzed and differences between teachers and mothers of middle-class and disadvantaged children were presented. For different reasons, it was decided to drop the teacher variable from both the middle class and the disadvantaged parts of the project.

TABLE 8

MEAN SCORES ON FOUR SCALES OF THE MARYLAND PARENT ATTITUDE SURVEY FOR EIGHTY-TWO MIDDLE- AND THIRTY-EIGHT LOWER-CLASS MOTHERS

	Disciplinarian	Indulgent	Protective	Rejecting
	Middle Class			
M	23.74	21.37	25.82	18.65
SD	5.83	6.87	5.12	6.27
N	82			
	Disadvantaged			
M	26.71	18.03	27.79	17.13
SD	5.10	6.63	5.67	5.60
N	38			
t	2.67*	2.48*	1.87	1.27

*$p < .05$

Correlations made with teacher attitude scores and nursery school children's achievement scores were generally negligible with the exception of two subscores and the total scores which were positively correlated significantly for middle-class girls.

High and low groups for maternal attitudes were found for each socioeconomic level by adding the Disciplinarian and Indulgent scales and dividing at the median. The dividing score was higher for the middle-class sample, with a median of 45 compared to the 41 of the disadvantaged sample. Children's achievement scores were assigned to one of the following groups for each socioeconomic level: Montessori or Traditional school with high or low maternal attitudes.

The results of the several analyses of variance of achievement scores for both middle class and disadvantaged children were presented. Type of nursery school training was found to be significant for two subtests and the total scores for middle-class children and for all parts of the test and the total for disadvantaged children.

These results, their significance and possible conclusions which may be drawn from them are the topics for discussion in the next chapter.

CHAPTER V

DISCUSSION

An analysis of variance of each part of the Caldwell Preschool Inventory was made for each socioeconomic level in order to determine areas of strength and/or weakness. The unequal distribution of teacher attitude scores between Montessori and traditional nursery school teachers in the middle class and the loss of a traditional nursery school teacher mid-term necessitated a change in experimental design and the elimination of the teacher attitude variable from the analyses of variance. However, correlations between teacher attitude and achievement scores were made. The performance of the middle-class children is discussed first, after which the performance of the disadvantaged children is examined. The correlations with teacher attitude are considered also.

An examination of Tables 4 and 8 shows one factor significant: type of nursery school training.

Type of Nursery-School Training--Middle-Class Children

Middle-class children who attended Montessori schools obtained higher achievement scores in all areas--Personal-social Responsiveness, Associative Vocabulary, Numerical and Sensory Concepts--than children who attended traditional schools. (See Appendix C). Each area of the achievement test will be discussed separately, considering both the middle-class and the disadvantaged child's performance on each part. The differences in achievement are seen as evidence of greater cognitive maturity of the Montessori school child. The program of the school itself and the classroom organization which implements it also will be examined in order to consider their contribution to the more effective cognitive functioning.

Personal-social Responsiveness

In the analysis of Personal-social Responsiveness, the first part of the Caldwell Preschool Inventory, Factor A, type of nursery school training was significant at .05. Children attending Montessori schools obtained higher scores on this aspect of the test than did children attending traditional schools. Therefore, Hypothesis 2, in which it was stated that the level of ability in Personal-social Responsiveness of children attending traditional schools would be significantly higher than that of children attending Montessori nursery schools must be rejected.

Personal-social Responsiveness was designed to measure the child's knowledge of his world and to measure his ability to establish rapport with and to respond to verbal instructions of an adult.[1] While it is necessary to have some rapport with an adult in order to be able to answer the questions and carry out the directions of this part of the test, it seems obvious from an inspection of the items that this is not the only attribute necessary for success. A knowledge of several kinds of concepts is necessary to be able to do the tasks required; concepts such as loudly, softly, on, under, or middle-sized. In spite of the fact that this section of the test was designed to measure practical abilities and the ability to establish rapport, it contains a conceptual factor highly related to the general cognitive functioning of the child.[2]

It is difficult to determine how many of the concepts necessary for success in this area were taught directly by the traditional schools because of the less structured type of curriculum employed. It is known, however, that some of the traditional schools involved in this study did put some emphasis on the learning of color names. Which of the other concepts that were taught in the traditional schools cannot be determined.

The reason that Montessori children should do better on this factor than traditional school children remains to be considered. That children in Montessori schools are taught directly some of the concepts necessary to performing well on this part of the test is probably not an important factor. They are taught their names, concepts such as loudly and softly, and color discrimination. Generally, they are not taught their age, birthday, parts of the body, to wiggle or jump, which account for twelve points out of the twenty-six. Only part of the higher scores on this concept, then, can be attributed to direct training.

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[1] Caldwell, The Preschool Inventory, Directions for Administering and Scoring, p. 2.

[2] Caldwell, The Preschool Inventory, Technical Report, p. 18.

Several other explanations are possible: one, Montessori children are encouraged to do things independently; by nature of their program, they may have become quite competent in their school environment and perhaps in the larger sense of the word, in the world in which they live. Because of these factors, they may be able to handle new situations (i.e. testing) with greater ease and proficiency. On the other hand, Montessori children may have attained a higher level of cognitive maturity through their more extensive cognitive experiences. This may have enabled them to attain a higher score on this part of the achievement test.

Associative Vocabulary

For Part II, Associative Vocabulary, the difference in achievement scores is significant at the .05 level in favor of middle class Montessori children. In carrying out actions and making associations between words, as well as in supplying labels, Montessori nursery school children were found to be superior to their counterparts in traditional nursery schools.

The difference in achievement on this factor points to the possibility that, for the middle class children at least, Montessori children developed more complex cognitive structures than non-Montessori children. This will be discussed in greater detail later in this chapter.

Results of this study follow the pattern common to other Montessori- non-Montessori studies, (Argy,[1] Fleege,[2]): that Montessori children were consistently higher in verbal abilities.

Concept Activation-Numerical

On the third part of the test, Concept Activation-Numerical there was no significant difference between the two middle class groups. In the light of the better performance by children in Montessori schools on the other parts of the test, their poor scores here were not expected. Montessori children are taught, directly, numerical relationships. It is possible that the traditional schools may also have taught counting and concepts such as more, few, first, second, etc., and it is possible that the traditional schools taught them as well as the Montessori schools. Or, the Montessori children may not have reached the counting and number stage in the prescribed curriculum. (Arithmetic is not taught until the child complete the exercises of Practical Life and the Sensorial Materials.) According to one nursery school teacher, most of the children in the study had not used most of the Montessori numerical apparatus as they would not normally have reached this step during their first year in the program.

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[1] Argy, Rehabilitation Literature, XXVI (1965), 294-304.

[2] Fleege, "A Study of the Comparative Effectiveness of Montessori Preschool Education."

Concept Activation-Sensory

The results of the analysis of variance for Part IV, Concept Activation-Sensory, are also interesting in that there are no significant differences on this factor. One would expect that sensory concepts, an important part of the training of Montessori children, would be one of the areas in which Montessori children would excel. But this was not the case. The results approach significance (.10). The middle-class children in Montessori schools performed only slightly better than children in traditional schools in this area.

From the foregoing, it seems that the specific concepts taught in Montessori schools did not contribute greatly to the greater achievement of the Montessori child. The Montessori child did most poorly when compared to the traditional-school child in that area which was taught directly: the sensorial. The question remains then, why did the middle-class children in the Montessori schools perform better in overall achievement than middle-class children in traditional schools? Table 4 shows this difference to be significant at the .05 level of confidence. An attempt to answer this question will be made after a review of the scores of the disadvantaged children.

The Disadvantaged

Initial Scores

Consideration of the test performance of the disadvantaged children must be taken in light of the original IQ scores of this group. The mean scores, (Table 6) show great differences in both IQ and age among the groups. The Montessori children were younger, but they obtained higher IQ scores. The traditional school children were older, but obtained lower scores. Surely, the "cumulative deficit" of disadvantaged children is not already so flagrantly in operation!

There may be several reasons for the differences in original IQ scores. The one which probably merits the greatest consideration is based on informal observation. Several of the testers, independently, commented to the author and confirmed her own observations that children who attended the Head Start Montessori schools as well as the Montessori school for both middle and lower class children seemed to have better home environments than children from the traditional schools used in this project. It was felt that they had more stable families, greater participation by fathers, and parents who seemed to care more about them and their attendance at school. Some of the observations that led to these conclusions were: the time of arrival at nursery school (anywhere between 9:30 and 11 for a 9-12 session compared with schools whose children were generally there by 9 or sometimes before 9 for breakfast); participation in parents' meetings: at one traditional school such a meeting produced two mothers; at the other school, twenty-two parents (both men and women) whose children attended Montessori classes attended. It is certainly possible that this difference in home environment may have contributed to the differences in initial IQ.

While it was felt that this factor was not directly related to the type of nursery school in which the parents enrolled their children, is certainly a complicating factor in the study of achievement of children attending different nursery schools. It is possible that the children in the Montessori schools were drawn from a more settled neighborhood with more stable family organizations than the children who attended the traditional schools. Perhaps the original designation of lower socioeconomic class, using Head Start standards, was not sensitive enough a measure. The differences within this group may still be very great. (It should be pointed out here that an attempt was made to include participation of a traditional-nursery school class which met in the same school building as the Head Start Montessori classes, but this was not permitted by Head Start researchers.)

Achievement Scores

The most striking aspect of the achievement scores of the disadvantaged children is the fact that three groups performed equally well, while the third was consistently lower. Groups I and II, both Montessori-school children, and Group IV, Traditional-school, maternal attitude low were similar in their performance throughout the achievement tests. (See Appendix D).

It may be the equating of the age-IQ differences which enabled the children in the three groups to perform equally well.

Group I was the youngest (41.6) but had the highest IQ (99.0) originally. Group II was older (47.1) and had a lower IQ than Group I (91.4). Group IV, older still (48.3) had a lower IQ (85.0). When the raw scores were changed to standard scores, the age differences was controlled and the children's performance seemed to be in line with their intelligence scores.

It should also be mentioned that one of the traditional-school classes met for only two hours a day. However, during most of the year, the Head Start classes had only about two hours class time as the children ate breakfast at the beginning of the morning and stopped early for lunch. (By spring, this seemed to have changed somewhat for one center, although starting time was still late.)

Considering the great differences in age and IQ in the sample groups, it might have been better to have included the Caldwell in the initial testing battery. In that case the score used in the final analyses would have been a "change" score. These problems could be considered more seriously if the sample had been a little larger. Little of value can be said about Group III, the lowest performing group, which contained only six children.

Change in IQ

On the change in intelligence scores, the traditional-school, maternal attitude high and the two Montessori groups made the greatest gains. The traditional-school, maternal attitude low group (IV) did most poorly here. The F tests on the analysis of variance were not significant, however. (See Appendix B).

Nursery School Training

The value of different types of nursery school training for disadvantaged children is difficult to ascertain, given the foregoing problems. There are certain facts which should be pointed out, however. Children in the two Montessori groups obtained the highest IQ scores at the beginning of the study, and they made greater gain in IQ scores than children in the traditional school groups. The average gain in IQ for the Montessori children was 6.05 points while the traditional school children averaged a gain of 2.61 points. These differences were not significant, but the direction seems to follow that of the middle class study: the children in the Montessori classes seemed to increase their cognitive abilities to a greater extent than the children in the traditional school classes. Whether this is due to the type of nursery school training or the quality of their home life cannot be definitely determined at this time.

The middle class study points toward the Montessori classes as being the chief cause of differences in cognitive abilities of preschool children. An explanation of the reasons for this will be given next.

Cognitive Maturity and the Montessori-School Child

There are several reasons which may account for the differences in cognitive functioning between the traditional school and the Montessori-school children. The first will be discussed in terms of cognitive maturation. Other possibilities will be considered in terms of motivation and classroom organization.

The Development of Cognitive Processes

The way in which a person learns and the growth of mental functions have long been recognized as problem areas but have never been satisfactorily explained by traditional stimulus-response learning theorists. The cognitive theorists, on the other hand, have produced theories which account for a wide variety of learning phenomena. Following their work, and more specifically that of Piaget, the position taken in this paper is that cognitive structures, rather than responses, are learned, and that learning occurs as the individual is able to assimilate new information into his existing cognitive structures, and to adapt it to fit his existing intellectual organization.[1]

Cognitive growth is possible through the continuous interaction of assimilation and accommodation. Explaining Piaget's theory, Flavell states,

> To the extent that a newly accommodated-to feature can fit somewhere in the existing meaning structure, it will be assimilated to that structure. Once assimilated, however,

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[1] John H. Flavell, The Developmental Psychology of Jean Piaget (Princeton, N.J.: D. Van Nostrand Co., Inc., 1963).

> it tends to change the structure in some degree, and through this change, make possible further accommodatory extensions.[1]

In addition, such structures are continually changing and reorganizing even in the absence of environmental stimulation.

However, the organism cannot assimilate everything in the environment.

> The organism can assimilate only those things which past assimilations have prepared it to assimilate. . . . A new assimilating structure must always be some variate of the last one acquired and it is this which insures both the gradualness and the continuity of intellectual development.[2]

When the mental processes are far enough advanced that self-contradictions occur, the process Piaget calls equilibration is set in motion to reorganize and transform the previous knowledge.

It follows that the child, using the Montessori system of precisely graduated materials, would find it easy to assimilate and adapt new concepts into his existing structures because progress in each area is gradual. The variety of perceptual and cognitive exercises in all areas and the fact that the child is allowed to repeat an exercise until he feels ready to go on would all contribute to his greater intellectual development according to this theory. These perceptual-cognitive exercises expand his knowledge of his environment, improve his ability to conceptualize and make him better able to adapt to new problems and exercises as they arise.

Support for the fact that the environment performs an essential role in the kind and rate of development of the child comes from sources other than Piaget. Hunt, relying on the work of Hebb and others, has pointed out that the more and greater variety of experiences the child has, the better able he is to cope with new and more complex experiences. Or, in his words, "The greater the variety of situations to which the child must accommodate his behavioral structures, the more differentiated and mobile they become."[3]

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[1] *Ibid.*, p. 49.
[2] *Ibid.*, p. 50.
[3] Hunt, *Preschool Education Today*, pp. 25-721.

Effect of Classroom Organization

There are other aspects of Montessori schools which should be mentioned here because they affect intellectual development. The first is the fact that children in Montessori schools work individually on things that interest them. There is no attempt to keep children doing the same thing at the same time. In this way, each child progresses according to his own abilities. As Blank and Solomon[1] have pointed out, learning is an individual experience. "If learning is to occur, the child must involve himself actively with the stimuli so as to comprehend their significance." This occurs less often in a group situation, where it is possible to sit passively and not participate, or perhaps only imitate others. Furthermore, the child in the Montessori school is allowed to work with his choice of equipment for whatever length of time he chooses. He may wash a table, play with the number rods, or just watch other children all morning if he so chooses.

> In such a setting the child has an opportunity to find those particular circumstances which match his own particular phase of development and which provide the proper degree of incongruity for intrinsic motivation. This may well have the corollary advantage of making learning fun and the school setting interesting and attractive.[2]

Undoubtedly, this match of child to activities contributes much to each child's learning in a Montessori classroom.

Another aspect of Montessori schools to which the greater mental abilities, particularly verbal ability, may be attributed, is that children of different ages, 3-6 years, are together in the same classroom. This has the obvious advantage for the younger children of having many models for imitation, particularly better speech models, than are present in the traditional schools (where three-year-olds have only other three-year-olds to imitate.) This fact of daily interaction with older children may be one of the factors which greatly enhances the young child's ability to communicate verbally.

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[1] Marion Blank and Frances Solomon, "A Tutorial Language Program to Develop Abstract Thinking in Socially Disadvantaged Preschool Children," Child Development, XXXIX, No. 2 (June, 1968), 379-389.

[2] Hunt, Preschool Education Today, p. 39.

The motivation of the child is also increased by this grouping as the young child wants to be able to do what the older children are doing.

According to the hypothesis on which this study is based, type of nursery school training is not the only important factor in the intellectual development of the child. We shall turn, then, to two other important variables: maternal attitudes and teacher attitudes.

Maternal Attitudes

It had been hypothesized that those mothers who were warm and nurturant as well as firm and demanding would create in their children a high need for achievement. These high need achievers would learn more than children whose mothers were less nurturant and demanding. This hypothesis must be rejected. Factor C, maternal attitudes, had no significant affect on the achievement of nursery school children in this study. (See Appendices A and B).

Problems Relating to the MPAS

In understanding this result, the first possibility to consider is that the mothers who were most firm and demanding and warm and accepting might not have been selected by the process used in the study. That is, adding the scores on the two scales and then finding those mothers above and below the median might have included many mothers who were very highly indulgent or very highly disciplinarian. Therefore another study was made, this time finding the median of each scale separately. Those mothers who were above the median on both scales, then, were termed the "high" group and those below the "low" group. (There were only a few parents in the high groups in each cell.)

An analysis of variance was made with this new criteria for the "C" factor. The results were similar to the first analyses with one exception. Factor A, type of nursery school training was significant at .05 on Part III of the achievement test, concept activation-numerical.

The next possibility considered was whether or not proper assumptions were made concerning the four scales of the Maryland

Parent Attitude Survey. Brody[1] found a high negative correlation between the disciplinarian and the indulgent scales on the MPAS, which might indicate that parents high on the disciplinarian scale would be cold and unaccepting toward their children. This possibility is not upheld by other research. Becker, *et al.*[2] refuted by factor analysis the belief that parents who are accepting are necessarily permissive, democratic, and nonpunitive. Milton[3] also found warmth and permissiveness to be two independent dimensions. Mote[4] reported that the four strongest items from her "Pressure for Achievement and Independence Scale" correlated highly with three items from the Infant Warmth Scale. Baumrind and Black[5] reported, "Firm demanding behavior on the part of the parent was not associated . . . with punitiveness or lack of warmth. The opposite was true."

Brody[6] also correlated scores on the Maryland Parent Attitude Survey with the Parental Attitude Research Instrument. She found the disciplinarian scale of the MPAS related to the Authoritarian scale of the PARI (p .05). The indulgent scale of the MPAS was positively correlated with the democratic scale and inversely correlated with the hostility-rejection scale (p .05 for both). The Maryland Parent Attitude Scale therefore has concurrent validity.

Perhaps more important for the present research, Brody tried to determine whether several maternal attitude factors could be related to maternal behavior when the mother was observed with her child in a standardized play situation. Her findings did not support a strong relationship between expressed maternal attitude and observable behavior in a standardized situation. However, she did find the MPAS Disciplinarian Scale to be related to behavior which restricted the child's activities.[1]

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[1] Grace F. Brody, "Relationship Between Maternal Attitudes and Behavior," *Journal of Personality and Social Psychology*, II, No. 3 (1965), p. 318.

[2] Becker, *et al.*, *Journal of Consulting Psychology*, XXIII, 107-118.

[3] G. A. Milton, "A Factor-Analytic Study of Child-Rearing Behaviors," *Child Development*, XXIX, No. 3 (September, 1958), pp. 381-392.

[4] Florence Blades Mote, "The Relationship Between Child Self Concept in School and Parental Attitudes and Behaviors in Child Rearing," (unpublished Ed.D. dissertation, Stanford University, 1966.)

[5] Baumrind and Black, *Genetic Psychology Monographs*, LXXV, 43-88.

[6] Brody, *Journal of Personality and Social Psychology*, II, No. 3 (1965), 318.

Contradictory viewpoints concerning restrictive behavior have been reported. Restrictive behavior has been found to be related unfavorably to children's conduct[2] favorably[3] and unfavorably[4] to intellectual achievement. In the Baumrind and Black study, sons whose mothers were restrictive and did not permit them to explore the environment exhibited dependent behavior.[5] If then, the disciplinarian parent of the MPAS describes a parent who is not only demanding but restrictive, this lack of freedom on the part of the child may not have permitted maximum opportunity for the development of motivation or skills conducive to achievement.[6] Further validity studies of the scales of the Maryland Parent Attitude Survey would be necessary to verify this assumption.

Other Parental Factors

It has been suggested that the expectations and goals of the parents, their values and levels of aspiration, are more important than attitudes toward discipline, etc. Harris[7] has suggested that it may be better to study the "parent's hopes for the child, his image of the adult the child might become." It would be expected, however, that parents who hold high goals and aspirations for their children would expect and demand more from them, and that these attitudes would be evident from the disciplinarian scale. On the other hand qualitative differences might exist. Nichols and Holland report that the parents' desire that his child be conforming or possess socially desirable traits (happy and well-adjusted, etc.) is negatively related to achievement in the child. They also reported that when parents were not interested in an area, the child's achievement in that area was inhibited.[1] Some parents are more interested in physical prowess--games and sports, for example--than they are in reading or intellectual exercises. This type of attitude probably was not tapped by Maryland Parent Attitude Survey.

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[1] Ibid., p. 320.

[2] W. H. Lyle and E. E. Levitt, "Punitiveness, Authoritarianism and Parental Discipline of Grade School Children," Journal of Abnormal and Social Psychology, LI (1955), 42-46.

[3] A. L. Baldwin, J. Kalhorn and F. H. Breese, "Patterns of Parent Behavior," Psychological Monographs, LVIII, No. 3 (1945), 268.

[4] Drews and Teahan, Journal of Clinical Psychology, XIII, No. 4 (October, 1957), 328-332.

[5] Baumrind and Black, Genetic Psychology Monographs, LXXV (1967), 325.

[6] David C. McClelland, et al., The Achieving Society (Princeton, N.J.: Van Nostrand Co., 1958), chapter 9.

[7] Dale B. Harris, "Conceptual and Methodological Developments in Parent-Child Research," Child Development, XXXI, No. 4 (1960), 821.

There are several other aspects of parent-child interaction which may have bearing on the achievement of the child and which were not detected by the MPAS. One of these is the involvement by parents with their children. Durkin surmised that the most important factor about the parents of early readers was their presence--and their participation in activities with their children: reading and answering questions, for example.[2] Honzik also reported the importance of able and concerned parents and an "activating" mother which were positively related to cognitive development.[3]

Birth order may also be important. Rothbart found that mothers exerted more direct pressure for achievement on first-born children and were more anxious about their performance on a picture-naming task.[4] Hilton, however, found first-born children significantly more dependent than later-born children.[5]

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[1] Robert C. Nichols and John L. Holland, "Prediction of the First Year College Performance of High Aptitude Students," _Psychological Monographs_, LXXVII, No. 7, Whole No. 570 (1963), 1-29.

[2] Durkin, _Children Who Read Early_, p. 136.

[3] Marjorie P. Honzik, "Environmental Correlates of Mental Growth: Prediction From the Family Setting at Twenty-One Months," _Child Development_, XXXVIII, No. 2 (1967), 337-364.

[4] Mary L. K. Rothbart, "Birth Order and Mother Child Interaction," (unpublished Ph.D. dissertation, Stanford University, 1967).

[5] Irma Hilton, "Differences in the Behavior of Mothers Toward First- and Later-Born Children," _Journal of Personality and Social Psychology_, VII, No. 3, Part 1 (1967), 282-290.

The importance of family size on parent-child interaction should not be overlooked. Lansky found that the family structure affected the attitudes of parents toward their children.[1]

Finally, sex difference should be considered. It is known that attitudes of mothers and fathers and the pattern of familial relationships varies for male and female children.[2] Findings of Honzik,[3] Baumrind and Black,[4] Baer,[5] Bing,[6] and Nichols and Holland[7] suggest a marked sex difference in the relevant affectional millue which related to cognitive development. Bayley and Schaefer found marked and consistent sex differences between maternal behaviors and intelligence scores in boys and girls.[8]

Type of Achievement Behavior Measured

So far the problems relating to the instrument used to assign parents to groups and the possibility that other parental factors may have been important in the achievement behavior of children have been discussed. Now we may consider another problem: the kind of achievement behavior measured. Crandall, Katkovsky and Preston have suggested five areas of possible achievement behavior: intellectual, physical skills, artistic-creative, mechanical and social. They further state that achievement behaviors are not global--that they may vary markedly from one area to another.[1] Harris suggested that achievement needs may vary systematically with developmental stages, and that achievement needs in the young child may relate more to motor exploration of the environment than to any other types of behavior.[2] If children have different achievement needs and the young child concentrates more on motor skills, it would account for the fact that maternal attitudes believed to be important in developing achievement need in children had no effect on the actual achievement of nursery school children as measured by the Caldwell Preschool Inventory.

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[1] Leonard M. Lansky, "The Family Structure Also Affects the Model: Sex-Role Attitudes in Parents of Preschool Children," Merrill Palmer Quarterly, XIII, No. 2 (April, 1967), 139-150.

[2] M. L. Kohn and E. E. Carroll, "Social Class and Allocation of Parental Responsibilities," Sociometry, XXIII (1960), 110.

[3] Honzik, Child Development, XXXVIII, No. 2 (1967), 358.

[4] Baumrind and Black, Genetic Psychology Monographs, LXXV (1967), 358.

[5] Daniel J. Baer and T. A. Ragaster, "Relationship Between Perceived Child-Rearing Practices and Verbal and Mathematical Ability," Journal of Genetic Psychology, LXXXV, No. 1 (1966), 105-108.

[6] E. Bing, "Effect of Child Rearing Practices On Development of Differential Cognitive Abilities," Child Development, XXXIV (1963), 631-648.

[7] Nichols and Holland, Psychological Monographs, LXXVII, No. 7, Whole No. 570 (1963), 20.

[8] Nancy Bayley and Earl S. Schaefer, "Correlates of Maternal and Child Behavior in the Development of Mental Abilities," Monographs of the Society for Research in Child Development, XXIX, No. 6 (1964).

Interactions

No interactions were significant.

Teacher Attitudes

The unequal distribution of teacher attitude scores between Montessori and traditional nursery school teachers and the loss of a teacher from the disadvantaged group necessitated a change in experimental design and the elimination of the teacher attitude variable from the analyses of variance. However, correlations between teacher attitude and achievement scores were made. These as well as the unusual points concerning the teacher attitude scores obtained in this study are discussed in the following section.

Before discussing the effect of teacher attitude scores on nursery school children's achievement, it should be noted that all teacher attitude scores obtained in this study were lower than those commonly found among nursery school teachers, and that there was no significant difference between Montessori and traditional nursery school teachers' scores.

Most of the teachers in the present study fell below the fiftieth percentile on the norms reported in the Manual for graduating seniors in early childhood education. The mean score in this study was 47.7 as compared to the norm mean of 80.4.[1] Studies by Callis[2] and Fuller[3] also found that early childhood education majors ranked higher than other educational groups. The mean score for students planning to become nursery school teachers was 102.2 in Fuller's study. Cook[4] has pointed out that scores change somewhat before and after teaching. He found that experienced teachers tended to show lower (more authoritarian) scores than beginning or relatively inexperienced teachers.

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[1] V. J. Crandall, "A Conceptual Formulation for Some Research On Children's Achievement Development," Child Development, XXXI, No. 4 (December, 1960), 790.

[2] Harris, Child Development, XXXI, No. 4 (1960), 818.

High scores on the MTAI have been found to be associated with a tendency to select extreme rather than moderate response positions on the items of the inventory.[5] This may have been a factor in the low scores obtained in this study. Of course, the small size of the sample of teachers must also be taken into account.

The second point concerning the teacher attitude scores is the difference between the Montessori and traditional school teacher scores. It has been noted earlier in this study that Montessori teaching philosophy suggests a different type of teacher-pupil relationship than that of traditional nursery schools. In traditional schools, the teacher often assumes the role of the mother-substitute, giving love and affection, doing things for the child, and encouraging a dependent relationship. Montessori teachers, on the other hand, encourage independence and self-discipline in children. In addition, Montessori equipment is designed to be used in definite, prescribed ways. These factors have led to the belief that Montessori teachers are "different" from traditional nursery school teachers: that Montessori teachers are less warm and supportive and more authoritarian.

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[1] Walter W. Cook, Carroll H. Leeds and R. Callis, Minnesota Teacher Attitude Inventory Manual (New York: Psychological Corp., 1951), p. 9.

[2] Robert Callis, "Change in Teacher-Pupil Attitudes Related to Training and Experience," Educational and Psychological Measurement, X, No. 4 (Winter, 1950), 726.

[3] Elizabeth M. Fuller, "Use of Teacher-Pupil Attitude Tests, Self-Rating and Measure of General Ability in the Preservice Selection of Nursery-School and Kindergarten--Primary Teachers," Journal of Educational Research, XLIV (May, 1951), 678.

[4] Desmond L. Cook, "A Note on the Relationship Between MTAI and GZTS Scores for Three Levels of Teacher Experience," Journal of Educational Research, LV, No. 8 (May, 1962), 364.

[5] William C. Budd and Lynda S. Blakely, "Response Bias in the MTAI," Journal of Educational Research, LI (1958), 708.

It can be seen from Tables 2 and 5 that these assumptions were not upheld in this study. Montessori teachers scores ranged from 19-68 with a Mean of 47.5 while traditional school teachers scores ranged from 3-50 with a Mean of 35. In this small sample, Montessori nursery school teachers were more democratically inclined than traditional nursery school teachers.

The lack of or low correlations between teacher attitude scores and achievement of nursery school children may be due to many factors: the differences in the number of teacher per class, the possibility that warmth may be a threshold factor, and the fact that different teachers affect pupils differently. Each of these are discussed in greater detail.

The teacher attitude correlations may have been influenced by the fact that in the traditional nursery schools there were two teachers to a class for two of the three classes participating in the study. While these teachers obtained scores within twenty points of one another, it may be that having two teachers, one perhaps slightly "warmer" than the other, may have dissipated the effect of either.

Another explanation of the teacher attitude factor may be that for nursery school teachers, warmth may act as a threshold factor. That is, a certain amount of it is necessary in order to establish good rapport with the children. Amounts above this may not contribute much to the teacher's effectiveness.[1]

Perhaps a better explanation than any of the foregoing is that fact that teachers affect different pupils differently. In a study of pupil's values and the validity of the Minnesota Teacher

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[1] David E. Lavin, The Prediction of Academic Performance: A Theoretical Analysis and Review of Research (New York: Russell Sage Foundation, 1965), p. 39.

Attitude Inventory, Della Piana and Gage[1] found that teachers scoring high on the MTAI were best for pupils with strong affective needs and orientation. If pupils had strong cognitive values, teachers' MTAI scores made less difference. Traditionally we have expected very young children to have great affective needs. At the nursery school level as well as any other, pupils may differ greatly in their affective needs.

Other factors, such as stimulation and expectation, might also account for the differences in the achievement of children. Miriam Goldberg recognized this factor and pointed out, "Most teachers . . . vary in their effectiveness, depending upon the characteristics of the pupils they confront, the opportunity to fulfill their expectations for themselves and for their class, the content of what they teach, and the extent to which the school provides them with what they perceive to be necessary facilitations."[2]

It is in the area of expectation that we may have the greatest difference in teacher attitudes, although these are attitudes not measured in this study. The expectation of teachers may have contributed to the differences in achievement of children attending different types of nursery schools. The Montessori teachers, by training, expect that their students will learn certain concepts, will accomplish many skills, will develop certain aspects of behavior in the classroom. They have a long history of evidence for this beginning with the achievements of the slum children of Rome with whom Montessori first worked. On the other hand, many traditional teachers, while expecting meaningful achievement in social skills, do not expect the child to operate independently in his environment. In other words, many traditional nursery school teachers expect that their students will not learn or will learn only very slowly the same things Montessori teachers expect their children to learn at an early age. Research in this area has shown that the expectation of the teacher is an important variable in the achievement of the child. It would be of interest to pursue this further at the nursery school level.

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[1] G. M. Della Piana and Nathaniel L. Gage, "Pupils' Values and the Validity of the MTAI," Journal of Educational Psychology, XLVI (May, 1952), 702.

[2] Miriam L. Goldberg, "Adapting Teacher Style to Pupil Differences: Teachers for Disadvantaged Children," The Disadvantaged Child Issues and Innovations, ed. by Joe L. Frost and Glenn R. Hawkes (Boston: Houghton Mifflin Co., 1966), p. 350.

Summary

Type of nursery school training was found to be significant at .05 in a two-way analysis of variance of children's achievement scores for both middle class and disadvantaged nursery school children. Parts I and II, Personal social Responsiveness and Associative Vocabulary and the total scores of the Caldwell Preschool Inventory yielded significant differences in favor of the children who attended Montessori nursery schools. The differences in achievement are seen as evidence of greater cognitive maturity of the Montessori school child. This may occur as a result of several things: one, the Montessori system of precisely graduated materials may allow the child to assimilate and adapt new concepts into his existing cognitive structures. Two, the fact that the Montessori method encourages individual activities and the freedom to choose among these activities for whatever length of time the child chooses may enable the child to find an activity which fits his particular phase of development. Three, older children are in the same classroom and may be used as models for speech and general behavior.

Maternal attitudes had no significant affect on the achievement of nursery school children in this study. Several problems concerning the use of the Maryland Parent Attitude Scale were discussed, as well as other aspects of parent-child interaction which might affect the achievement of children and which were not detected by the MPAS. Among these are the expectations, goals, and values of the parents and the involvement of parents with their children--all of which may have great effect on the achievement of nursery school children.

Correlations were made with teacher scores from the Minnesota Teacher Attitude Inventory and children's achievement scores from the Caldwell Preschool Inventory. While most were negligible, three were moderate. Girls' scores on the subtests Concept Activation--Numerical and Concept Activation--Sensory and the total score were positively correlated (and significant at .05) with scores on the MTAI.

The low correlations between teacher attitude scores and achievement of nursery school children was seen as evidence of the fact that different teachers affect pupils differently and that other factors such as stimulation and expectation may contribute greatly to the effectiveness of the teacher and the achievement of her students.

CHAPTER VI

CONCLUSIONS

In this study democratic teacher attitudes were not highly related to the achievement of preschool children. While a democratic attitude is probably an important kind of teacher attitudes, it is not the only one or perhaps not even the most important one in determining the achievement of children. Warmth may act as a threshold factor. Some warmth is necessary for a teacher to function effectively with her students, but she may need also the ability to relate to pupils with cognitive needs as well as affectional ones, to be stimulating, and to expect her children to achieve the objectives of the system under which she operates. The importance of the different effects teacher attitudes may have on children of differing abilities, personalities and sex also should not be overlooked in future research.

Maternal attitudes, as measured in the study, had no effect on the achievement of nursery school children. In spite of these results, the hypothesis that parents who are demanding and accepting encourage achievement behaviors in their children still seems tenable. There are several possible reasons this study showed no effect for maternal attitudes. One is the instrument used. Validation of the scales through observation would be extremely useful. Perhaps the disciplinarian and indulgent scales didn't really isolate those parents who were demanding and accepting. Two, the "high" or "low" categories might have been more definitive; i.e., using the upper quartile compared with the lower quartile on these scales. A third possibility is that parents were chosen properly but that the achievement needs of their children may have been met in fields other than the academic. Much more research on all aspects of parental attitudes is needed.

Unfortunately, the study of the disadvantaged children was beset with such difficulties that no conclusions concerning nursery school training can be given with any degree of conviction. However, the effects of nursery school training also were significant in the achievement scores of middle class nursery school children. Montessori-school children obtained significantly higher scores on Personal-social Responsiveness, Associative Vocabulary and on total achievement.

The differences in achievement of children who attend different types of nursery schools may be thought of in terms of differences in cognitive maturity of these children. The growth of vocabulary may be significant in this regard. The Montessori children have translated more of their experiences into symbolic systems which allow meaningful mental manipulations to occur.

Although many opponents to Montessori schools have criticized them on grounds of the lack of conversation of children (individual work, the quiet room, no noisy children)[1] this evidence seems to refute their criticism. The fact that children are free to work with one another or individually as they wish may actually add to the possibilities for conversation when the child wants it. One Montessori teacher expressed no surprise at the higher associative vocabulary of the Montessori children. According to her, when the children finish with their work they sit down and talk about it.[2]

Another factor which may account for the increased verbal abilities of Montessori children is the wide range of age and ability in children present in each classroom. This might indicate that the practice of many nursery schools to try to arrange groups as nearly homogeneous as possible does not allow for as wide a range of experiences as may be desirable.

The fact that the test for Personal-social Responsiveness was significant could lead to interesting further research. Is it the fact that through the exercises of practical life, the emphasis on self-discipline, or some other factor of the Montessori school that caused the Montessori school child to do better than his contemporaries here? The hypothesis that the child who becomes competent in his environment adds to his self-concept and feels greater worth as an individual has been suggested by Reed[1] and Coopersmith.[2] Further research would be needed to determine whether or not: 1. Montessori children really are more advanced in Personal-social Responsiveness apart from the high cognitive factor involved in the test used in this study, 2. If so, whether this is due to some aspect of the Montessori school system, 3. If the above two are found to be true, can this be attributed to some change in the self-concept of the individual as he becomes more proficient in handling the problems of his environment?

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[1] LeShan, Conspiracy Against Childhood, pp. 73-86.

[2] Constance Condrell, personal communication, September 20, 1968.

Considering the emphasis put on sensorial materials in the Montessori schools, the Montessori children would be expected to perform very well in this area. Since the results of the test of sensory concepts were not significant, we might consider the following explanations: 1) the concepts in the test are not similar to the sensorial materials used in the schools, 2) the sensorial materials are not as important as previously thought in the Montessori schools and 3) the sensorial materials are important for later speech development (following Inhelder).

An examination of the items of Part IV of the test leads to the rejection of the first alternative since most of the items seem to deal with color or geometric designs, both a part of the Montessori program. The Montessori sensorial materials cover a much wider range of activities than are covered in the Caldwell Preschool Inventory, which would seem to reject the second alternative. However, it should be mentioned that the Sensorial is considered to be part of a three-year program in the Montessori schools.

The importance of the sensory development in the mental life of the individual is still a matter for research. Although no one today denies the importance of sensory stimulation for early intellectual development, whether or not it is a basis for later verbal abilities seems to be a matter of much speculation and little fact. The greater achievement of the Montessori children in verbal abilities than in sensory concepts in this study only adds to this problem, not to its solution.

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[1] Katherine H. Read, The Nursery School A Human Relationship Laboratory (4th ed.; Philadelphia: W. B. Saunders Co., 1966), p. 169.

[2] Stanley Coopersmith, The Antecedents of Self-esteem (San Francisco: W. H. Freeman and Company, 1967), p. 38.

In spite of the evidence against the sensorial program of the curriculum, Montessori schools seem to be doing what they say they are: developing intellectual abilities in their children. This leads to speculation about the traditional schools. Are these schools accomplishing what they purport to do: increasing personal-social adequacy through group socialization? The evidence of several studies reported by Bonney and Nicholson[1] is that levels of personal-social adequacy persist irrespective of group socialization experiences. More research in this area is needed.

Because the total achievement of the Montessori children was significantly greater than that of traditional school children, the question arises, what aspects of the Montessori system account for this? Further research in this area, perhaps observations combined with testing, would be helpful. Furthermore, the expectation hypothesis has not been researched at the nursery school level and might lead to some interesting conclusions. Neither do we know much about the emotional and social development of Montessori school children. Some would suggest that this area is quite restricted in the Montessori schools, but there is no research to back up that assumption. And, as previously suggested, the effect on the self-concept of competence is certainly a matter for more research.

Longitudinal studies to determine whether or not this gain in intellectual abilities was kept over a longer period of time would be helpful also.

While more research is needed on both Montessori and traditional nursery school practices, it is important to remember that the child is a whole being and not compartmentalized. As Berlyne has pointed out, the child does not undergo separate intellectual and emotional developments. "The most dispassionate pursuit of knowledge must be driven by some motive, and the directions in which drives and emotions impel behavior must depend on the structures made available by the growth of intelligence."[2]

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[1] M. E. Bonney and E. L. Nicholson, "Comparative School Adjustments of Elementary School Pupils With and Without Preschool Training," Child Development, XXIX (1958), 125-133.

[2] D. E. Berlyne, "Piaget's Theory of Cognitive Development," Behavior In Infancy and Early Childhood, ed. by Yvonne Brookhill and George G. Thompson (New York: The Free Press, 1967), p. 463.

It seems ridiculous that today, in our present state of enlightenment, it is necessary to reiterate the fact that in any type of education, the whole person must be considered. The individual develops in all areas simultaneously. While the social and emotional development of the young child is certainly important, it should not be overly emphasized at the expense of his cognitive abilities. It would be helpful if more research projects could be developed along these lines, that is, studying the social, emotional and intellectual development of the child simultaneously.

APPENDIX A

ANALYSES OF VARIANCE OF SCORES ON THE CALDWELL PRESCHOOL INVENTORY FOR EIGHTY-TWO MIDDLE CLASS CHILDREN

TABLE A

PART I--PERSONAL-SOCIAL RESPONSIVENESS

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	43.2	1	43.2	4.12[b]
C	6.0	1	6.0	. .
AC	2.0	1	2.0	. .
Within Groups	866.	78	10.48	. .
Total	917.2	81		

[a] A - Type of Nursery School
C - Maternal Attitudes

[b] $p > .05$

TABLE B

PART II--ASSOCIATIVE VOCABULARY

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	90.6	1	90.6	4.60[b]
C	14.2	1	14.2	. .
AC	9.8	1	9.8	. .
Within Groups	1536.	78	19.69	. .
Total	1650.6	81		

[a] A - Type of Nursery School
C - Maternal Attitudes

[b] $p > .05$

TABLE C

PART III--CONCEPT ACTIVATION-NUMERICAL

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	20.4	1	20.4	1.78
C	.13	1	.13	. .
AC	15.8	1	15.8	1.38
Within Groups	888.4	78	11.4	. .
Total	924.73	81		

[a] A - Type of Nursery School
C - Maternal Attitudes

TABLE D

PART IV--CONCEPT ACTIVATION-SENSORY

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	31.2	1	31.2	3.99
C	10.2	1	10.2	1.30
AC	.12	1	.12	. .
Within Groups	608.8	78	7.80	
Total	650.32	81		

[a] A - Type of Nursery School
C - Maternal Attitude

TABLE E

PART V--TOTAL SCORE

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	698.5	1	698.5	5.54[b]
C	.9	1	.9	. .
AC	22.3	1	22.3	. .
Within Groups	9837.1	78	126.12	. .
Total	10558.8	81		

[a] A - Type of Nursery School
C - Maternal Attitudes

[b] $p > .05$

APPENDIX B

ANALYSES OF VARIANCE OF SCORES ON THE CALDWELL PRESCHOOL INVENTORY AND THE CHANGE IN STANFORD-BINET IQ FOR THIRTY-EIGHT DISADVANTAGED CHILDREN

TABLE F

PART I--PERSONAL-SOCIAL RESPONSIVENESS

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	1329.98	1	1329.98	17.28[b]
C	128.12	1	128.12	1.67
AC	275.86	1	275.86	3.58
Within Groups	2386.44	31	76.98	. .
Total	4120.40	34		

[a] A - Type of Nursery School
C - Maternal attitudes
[b] p .05

TABLE G

PART II--ASSOCIATIVE VOCABULARY

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	995.27	1	995.27	9.21[b]
C	135.93	1	135.93	1.26
AC	12.11	1	12.11	. .
Within Groups	3350.99	31	108.1	. .
Total	4494.30	34		

[a] A - Type of Nursery School
C - Maternal Attitudes
[b] p .05

TABLE H

PART III--CONCEPT ACTIVATION-NUMERICAL

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	912.22	1	912.22	10.43[b]
C	.786	1	.786	. .
AC	113.19	1	113.19	1.29
Within Groups	2712.43	31	87.5	. .
Total	3738.63	34		

[a] A - Type of Nursery School
C - Maternal Attitudes

[b] $p < .05$

TABLE I

PART IV--CONCEPT ACTIVATION-SENSORY

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	589.4	1	589.4	3.75
C	13.3	1	13.3	. .
AC	257.99	1	257.99	1.64
Within Groups	4870.77	31	157.12	. .
Total	[illegible]	34		

[a] A - Type of Nursery School
C - Maternal Attitudes

TABLE J

PART V--TOTAL SCORE

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	1243.07	1	1243.07	13.25[b]
C	47.42	1	47.42	. .
AC	310.25	1	310.25	3.31
Within Groups	2907.85	31	93.80	. .
Total	4508.59	34		

[a] A - Type of Nursery School
C - Maternal Attitude
[b] $p < .05$

TABLE K

STANFORD-BINET IQ CHANGE

Source of Variation[a]	Sum of Squares	df	Mean Square	F Ratio
A	83.64	1	83.64	. .
C	4.26	1	4.26	. .
AC	139.25	1	139.25	1.21
Within Groups	3440.9	30	114.7	. .
Total	3668.05	33		

[a] A - Type of Nursery School
C - Maternal Attitudes

APPENDIX C

MEAN ACHIEVEMENT SCORES ON THE CALDWELL PRESCHOOL INVENTORY FOR EIGHTY-TWO MIDDLE CLASS CHILDREN

TABLE L

	Montessori	Traditional
Maternal Attitude High	Group 1	Group 3
Part I	21.1	19.6
Part II	15.6	13.3
Part III	11.1	10.0
Part IV	14.2	13.7
Total	62.0	56.5
N	23	18
Maternal Attitude Low	Group 2	Group 4
Part I	21.7	20.4
Part II	15.0	12.9
Part III	11.1	10.1
Part IV	15.1	13.4
Total	63.0	56.8
N	23	18

APPENDIX D

MEAN ACHIEVEMENT SCORES ON THE CALDWELL PRESCHOOL INVENTORY AND CHANGE IN STANFORD-BINET IQ FOR THIRTY-EIGHT DISADVANTAGED CHILDREN

TABLE M

	Montessori	Traditional
Maternal Attitude High	Group 1	Group 3
Part I	19.2	13.5
Part II	9.8	5.7
Part III	10.0	5.8
Part IV	12.2	10.0
Total	51.4	35.0
IQ Change	t 4.4	t 5.3
N	12	6
Maternal Attitude Low	Group 2	Group 4
Part I	18.9	19.0
Part II	9.8	12.1
Part III	8.4	8.0
Part IV	11.8	12.0
Total	48.9	51.1
IQ Change	t 7.7	t 0.6
N	12	8

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